A COMPARATIVE STUDY TO ASSESS THE RESPIRATORY HEALTH AMONG DYEING, COTTON AND CEMENT FACTORY WORKERS IN SELECTED AREAS OF NAMAKKAL, TAMILNADU.

BY

30093631

A DISSERTATION SUBMITTED TO THE TAMILNADU Dr.M.G.R. MEDICAL UNIVERSITY, CHENNAI, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN NURSING

APRIL – 2011

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BY

30093631

Research Advisor: _____

Prof. Dr. JEYASEELAN MANICKAM DEVADASON, R.N., R.P.N., M.N., D.Lit., Ph.D.,

Clinical Speciality Advisor: _____

Dr. Mrs. TAMILMANI, R.N., R.M., M.N., D.Lit., Ph.D.,

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE IN NURSING FROM THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI.

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CERTIFIED THAT THIS IS THE BONAFIDE WORK OF

30093631

AT THE ANNAI J.K.K. SAMPOORANI AMMAL COLLEGE OF NURSING

SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF NURSING FROM THE TAMILNADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI.

Examiners:

1. _____

2. _____

_____

Dr. JEYASEELAN MANICKAM DEVADASON,
R.N., R.P.N., M.N., D.Lit., Ph.D.,
DEAN, H.O.D., Nursing Research,
Annai J.K.K. Sampoorani Ammal College of Nursing,
Komarapalayam.

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R.N., R.P.N., M.N., D.Lit., Ph.D.,
DEAN, H.O.D., Nursing Research,
Annai J.K.K. Sampoorani Ammal College of Nursing,
Komarapalayam.

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CHAPTER – I

INTRODUCTION

BACKGROUND OF THE STUDY

OCCUPATIONAL HEALTH IS CONCERNED WITH HEALTH IN ITS RELATION TO WORK AND THE WORKING ENVIRONMENT. OCCUPATIONAL HEALTH IMPLIES NOT ONLY HEALTH PROTECTION BUT ALSO HEALTH PROMOTIVE, CURATIVE, REHABILITATIVE SERVICES, A CONCEPT WHICH INCLUDES EVERY THING THAT CAN BE APPLIED TO PROMOTE HEALTH AND WORKING CAPACITY OF WORKERS.

OCCUPATIONAL HEALTH NURSING IS THE APPLICATION OF NURSING PRACTICE AND PUBLIC HEALTH PROCEDURES FOR THE PURPOSE OF PREVENTING, PROMOTING AND RESTORING THE

HEALTH OF INDIVIDUALS AND GROUP THROUGH THEIR PLACE OF EMPLOYMENT.

BY OCCUPATIONAL ENVIRONMENT "IT IS MEANT SOME OF THE EXTERNAL CONDITIONS WHICH PREVAIL AT THE PLACE OF WORK AND WHICH HAVE A BEARING ON THE HEALTH OF THE WORKING POPULATION". THE INDUSTRIAL WORKERS TODAY IS PLACED IN A HIGHLY COMPLICATED ENVIRONMENT WHICH IS GETTING MORE COMPLICATED AS MAN IS BECOMING MORE INGENIOUS. THE HEALTH OF THE INDUSTRIAL WORKERS WILL BE INFLUENCED BY CONDITIONS PREVAILING IN THEIR WORK PLACE. ONE OF THE DECLARED AIMS OF OCCUPATIONAL HEALTH IS TO PROVIDE A SAFE ENVIRONMENT IN ORDER TO SAFE GUARD THE HEALTH OF THE WORKERS AND TO STEP UP INDUSTRIAL PRODUCTION.

THE COMMITTEE ON OCCUPATIONAL HEALTH OF ILO/WHO **RECOMMENDED SIGNIFICANT ESSENTIAL GENERAL HEALTH MEASURES FOR THE WORKERS IN THE INDUSTRY SUCH AS ADEQUATE AND PERIODIC MEDICAL CHECK-UP AND SAFETY MEASURES TO BE PROVIDED TO THE EMPLOYEES.** INDIAN FACTORIES ACT (1948) **SECTION 11-20 ENSURES THE HEALTH OF WORKERS AND THE RESPONSIBILITIES OF EMPLOYERS TO MAKE PROVISION FOR MAINTENANCE OF HEALTH AND CLEANLINESS.**

TEXTILE MANUFACTURE UTILISES A WIDE RANGE OF CHEMICALS WHICH CAN BE HARMFUL TO THE ENVIRONMENT, TO PEOPLE WORKING IN TEXTILE PROCESSING AND TO CONSUMERS. THERE IS INFORMATION ABOUT THE ADVERSE EFFECTS ON

TEXTILE WORKERS AND THE EFFECTS OF PURE CHEMICALS, BUT THERE IS LIMITED INFORMATION ABOUT THE OVERALL TOXICITY OF DYED AND FINISHED MATERIALS.

COTTON DUST IS DEFINED AS DUST PRESENT IN THE AIR DURING THE HANDLING OR PROCESSING OF COTTON, WHICH MAY CONTAIN A MIXTURE OF MANY SUBSTANCES INCLUDING GROUND UP PLANT MATTER, FIBRE, BACTERIA, FUNGI AND OTHER CONTAMINANTS WHICH MAY HAVE ACCUMULATED WITH THE COTTON. INVISIBLE SMALL COTTON DUST PARTICLES ENTER INTO THE ALVEOLI OF THE LUNG THROUGH INHALATION AND ACCUMULATE IN THE LYMPH CAUSING DAMAGE TO THE ALVEOLI AND REDUCING THE CAPACITY OF RETAIN OXYGEN. AS THE COTTON DUST ACCUMULATES, THE WORKER

DEVELOPS A BROWN LUNG AND SUFFERS FROM BYSSINOSIS.

CEMENT FACTORY WORKERS ARE EXPOSED TO DUST AT VARIOUS MANUFACTURING AND PRODUCTION PROCESSES, SUCH AS HANDLING OF RAW MATERIALS, BLENDING, PACKING AND SHIPPING OF THE FINISHED PRODUCTS. THE AERODYNAMIC DIAMETER OF CEMENT PARTICLES RANGE FROM 0.05 TO 5.0 MICROMETER IN DIAMETER. THESE PARTICLES ARE RESPIRABLE IN SIZE HENCE CEMENT IS IMPORTANT AS A POTENTIAL CAUSE OF OCCUPATIONAL LUNG DISEASE. THIS PARTICLE SIZE DISTRIBUTION WOULD MAKE THE TRACHEOBRONCHIAL RESPIRATORY ZONE, THE PRIMARY TARGET OF CEMENT DEPOSITION. THE DEPOSITION OF INHALED MATERIAL IS PRIMARILY

DEPENDENT ON PARTICLE SIZE AND IS BEST DESCRIBED IN FORMS OF AN AERODYNAMIC DIAMETER. ALL PARTICLES WITH AN AERODYNAMIC DIAMETER IN EXCESS OF 10MM ARE DEPOSITED ON THE MUCOUS MEMBRANE IN THE NOSE AND PHARYNX AND PARTICLES BETWEEN 3 AND 10MM IN DIAMETER CAN BE DEPOSITED THROUGHOUT THE TRACHEOBRONCHIAL TREE. PARTICLES BETWEEN 0.1 AND 3MM IN DIAMETER ARE MOSTLY DEPOSITED WITHIN THE ALVEOLI AND PARTICLES SMALLER THEN 0.1MM REMAIN IN THE AIR STREAM AND ARE EXHALED.

THE WORLD HEALTH REPORT **SAYS THAT TWO THIRDS OF THE WORLD'S POPULATION SPEND ONE THIRD OF THEIR LIVES IN EARNING LIVING FOR THEMSELVES AND THEIR FAMILIES. THESE OCCUPATIONAL ACTIVITIES GENERATE REVENUE ESTIMATED AT 21.6 TRILLION TO SUSTAIN THE WORLD'S ECONOMY AND SOCIAL PROGRAMS, BUT THESE OCCUPATIONS PRESENT HAZARDS TO WORKERS HEALTH.** ILO/WHO **ESTIMATE THAT THEY RESULT IN 160 MILLION LAKHS OF OCCUPATIONAL DISEASE AND INJURY PER YEAR, INCLUDING AT LEAST 2, 00,000 FATALITIES. A SIGNIFICANT NUMBER DEVELOP INTO CHRONIC DEBILITATING DISORDERS AND DISEASES THAT ARE PREVENTABLE NEEDLESSLY AFFLICTING HUMAN HEALTH.**

DEVELOPING COUNTRIES UNDERGOING EMPOWERING AND EXPLOSIVE GROWTH OF

TECHNOLOGY AND FACING A SITUATION OF INDUSTRIAL REVOLUTION WORST THAN THE PRESENT DEVELOPED COUNTRIES FACED CENTURY AGO.

THE CHALLENGING TASK BEFORE US IS TO LEARN THE PAST BAD EXPERIENCE OF THESE INDUSTRIALLY ADVANCED COUNTRIES RIGHT AWAY PROVIDE OCCUPATIONAL HEALTH SERVICES AT THE PLACE OF EMPLOYMENT. A PRACTICALLY IDEAL AND SUCCESSFUL ENTERPRISE LEVEL OCCUPATIONALLY NEEDED TODAY.

THE PRESENT STUDY IS FOCUSSED ON COMPARING THE RESPIRATORY HEALTH OF THE DYEING, COTTON AND CEMENT FACTORY WORKERS WHICH INVOLVES THE INTERVIEW ON RESPIRATORY

HEALTH AND OBSERVATION OF THE RESPIRATORY HEALTH PROBLEMS OF THE WORKERS.

NEED FOR THE STUDY

OCCUPATIONAL HEALTH NURSING IS A BRANCH IN COMMUNITY HEALTH NURSING, WHICH DEALS WITH THE EFFECTS OF OCCUPATION OR WORK PLACE ON HUMAN HEALTH. EVERY OCCUPATION IS ASSOCIATED WITH ONE OR OTHER ILL EFFECTS ON HEALTH. FEW SUCH OCCUPATIONAL GROUPS ARE DYEING, COTTON AND CEMENT FACTORY WORKERS WHO WERE SUSCEPTIBLE TO VARIOUS MORBID CONDITIONS BY VIRTUE OF WORK PLACE AND WORKING CONDITIONS. THESE MORBID CONDITIONS MAY RANGE FROM CHRONIC RESPIRATORY DISEASE DUE TO DUST INHALATION TO OTHER DISEASES.

TEXTILE MANUFACTURERS USE CHEMICALS WHICH ARE HARMFUL TO THE WORKERS AND TO THE CONSUMERS. FOR NEARLY 300 YEARS, WORK IN THE TEXTILE INDUSTRY HAS BEEN RECOGNISED AS HAZARDOUS.

INDIA HOLDS THE THIRD PLACE AMONG THE COTTON TEXTILE PRODUCING COUNTRIES OF THE WORLD PROVIDING EMPLOYMENT TO A LARGE NUMBER OF PEOPLE. FROM THE PRODUCTION OF TEXTILE MACHINERY AND EQUIPMENT, DYES AND RAW MATERIALS TO THE DELIVERY OF FINISHED TEXTILES, THE TEXTILE INDUSTRY IN INDIA HAS THE VAST POTENTIAL FOR CREATION OF EMPLOYMENT OPPORTUNITIES. INDIA'S TEXTILE INDUSTRY IS ONE OF THE ECONOMY'S LARGEST. IN 2000- 2001, THE TEXTILE INDUSTRIES ACCOUNTED FOR 4 PERCENT OF GDP, 14 PERCENT OF INDUSTRIAL OUTPUT, 18

PERCENT OF INDUSTRIAL EMPLOYMENT, AND 27 PERCENT OF EXPORT EARNINGS(HASHIM). IT ACCOUNTS FOR MORE THAN 73% OF TOTAL FIBRE CONSUMPTION IN THE SPINNING MILLS. THE PRODUCTION OF COTTON RISES FROM 30 LAKH BALES IN 1950- 1951 TO 140 LAKH BALES (170 KG IN EACH BALE) IN 2002- 2003.

INDIA IS THE SECOND LARGEST PRODUCER OF CEMENT ACCORDING TO THE CEMENT MANUFACTURERS ASSOCIATION. CEMENT INDUSTRY COMPRISES OF 125 LARGE CEMENT PLANTS WITH AN INSTALLED CAPACITY OF 148.28 MILLION TONNES AND MORE THAN 300 MINI CEMENT PLANTS WITH AN ESTIMATED CAPACITY OF 11.10 MILLION TONNES.

TEXTILE MANUFACTURE UTILISES A WIDE RANGE OF CHEMICALS WHICH CAN BE HARMFUL TO

THE ENVIRONMENT, TO PEOPLE WORKING IN TEXTILE PROCESSING AND TO CONSUMERS. REACTIVE DYES ARE COMMONLY USED ON COTTON AS THEY HAVE GOOD WET-FASTNESS, WHICH DEPENDS ON CONVERTING SOLUBLE SUBSTANCES INTO RELATIVELY INSOLUBLE COMPOUNDS IN THE FIBRE. REACTIVE DYES HAVE COMPLICATED CHEMICAL STRUCTURES, INCLUDING ORGANIC RING FORMS WITH COLOUR-GIVING DOUBLE BONDS. TYPICAL OF REACTIVE DYES IS THE FORMATION OF A STABLE COVALENT BOND BETWEEN THE HYDROXYL GROUPS OF THE CELLULOSE FIBRES AND THE REACTIVE GROUPS OF THE DYE. BECAUSE REACTIVE DYES ARE CHEMICALLY VERY REACTIVE, THEY ARE COMMONLY HARMFUL, ESPECIALLY IN POWDER FORM.

DOCKER ET AL, SHOWED THAT 15% OF WORKERS HANDLING REACTIVE DYES HAD WORK-RELATED RESPIRATORY AND NASAL SYMPTOMS. IT WAS NOTICED THAT THERE WERE SYMPTOMS OF ASTHMA, RHINITIS AND DERMATITIS IN WORKERS EXPOSED TO REACTIVE DYES.

SINGH MB (2005), SHOWED THAT WORKERS IN JODHPUR AND PALI SUFFERED FROM ACHES (19.4%) RESPIRATORY (12.1%) AND FEVER (7.7%) IN TEXTILE DYEING WORKERS THAN THE COMPARATIVE GROUPS.

EXPOSURE TO COTTON DUST CAN MEAN SERIOUS HEALTH PROBLEMS. THE FIRST SYMPTOM OF DISEASE IS DIFFICULTY IN BREATHING OR PERHAPS A TIGHTNESS IN THE CHEST WHICH IS PARTICULARLY NOTICEABLE ON THE FIRST DAY

BACK AT WORK AFTER A WORKER HAS BEEN OFF FOR A FEW DAYS WORKERS ALSO COUGH UP PHLEGM OR MUCOUS. IF THE EXPOSURE ABOVE THE LIMIT CONTINUES, WORKERS MAY DEVELOP BYSSINOSIS, ALSO KNOWN AS "BROWN-LUNG" DISEASE. WHILE EARLIER BREATHING DIFFICULTIES MAY BE REVERSIBLE, DAMAGE AT THE ADVANCED STAGES OF THE DISEASE IS PERMANENT AND DISABLING, AND ALSO INCREASED RISK OF CHRONIC BRONCHITIS AND EMPHYSEMA. NEARLY ABOUT 35, 000 INDIVIDUALS ARE DISABLED FROM BYSSINOSIS AS A RESULT OF EXPOSURE TO COTTON DUST (2004-2005)

OCCUPATIONAL LUNG DISEASES HEAD THE LIST OF 10 LEADING WORK RELATED DISEASES AND INJURIES. THE LUNG IS BOTH A TARGET ORGAN AND A PORTAL OF ENTRY FOR TOXIC SUBSTANCES.

ANNUALLY MORE THAN 5, 00,000 WORKERS ARE EXPOSED TO COTTON DUST. THE POTENTIAL IS HIGH RISK FOR WORK PLACE EXPOSURE TO SUBSTANCES CAUSING BYSSINOSIS, EMPHYSEMA, ASTHMA AND CHRONIC INDUSTRIAL BRONCHITIS.

BECK ET.AL., SHOWED THAT WORKER IN SOUTH CAROLINA HAD THE ESTIMATED AVERAGE OF 121 DEATHS OBSERVED ANNUALLY AMONG THE DISABLED WORKERS, 39 DIED AS A RESULT OF BYSSINOSIS.

DOCUMENTED PREVALENCE OF BYSSINOSIS WAS 8% IN CHINA, 30% IN INDONESIA, 37% IN SUDAN AND UP TO 50% IN INDIA. INDIA HAS A LARGE TEXTILE INDUSTRY EMPLOYING NEARLY 35% OF THE FACTORY WORKERS. INCIDENCE OF BYSSINOSIS IS REPORTED TO BE 7-8% IN THREE INDEPENDENT

SURVEYS CARRIED OUT IN MUMBAI, AHMEDABAD AND DELHI.

DUE TO THE CEMENT DUST AN ESTIMATED 1, 40,000 NEW CASES OCCURRED WORLDWIDE IN 1990; 86% OF THESE PATIENTS WERE MEN. THE INCIDENCE IS MORE COMMON IN URBAN THAT IN RURAL AREAS. IN 1981 RECORDED INCIDENCE IS HIGHEST AMONG MEN (>2.5/1, 00,000 PA) AND WOMEN (1/1, 00,000 PA) IN INDIA.

MIRZAEE (2007), SHOWED THAT CEMENT DUST EXPOSURE IS ASSOCIATED WITH ACUTE AS WELL AS CHRONIC RESPIRATORY HEALTH EFFECTS. COUGH, PHLEGM AND SHORTNESS OF BREATH WERE RELATED TO THE CEMENT DUST WHICH IS EFFECTING THE HEALTH OF THE WORKERS.

MASOUD NEGHAB (2007) SHOWED THAT EXPOSURE TO CEMENT DUST IS ASSOCIATED WITH RESPIRATORY SYMPTOMS SUCH AS COUGH, PHLEGM, WHEEZING AND SHORTNESS OF BREATH. IT IS MORE PREVALENT AMONG WORKERS WHO ARE WORKING AT THE LEVELS OF EXPOSURE TO INHALABLE AND RESPIRABLE CEMENT DUST.

EVERY THREE MINUTES SOME WHERE IN THE WORLD ONE WORKER DIES OF AN OCCUPATIONAL ILLNESS AND EVERY SECOND THAT PASSES AT LEAST 3 WORKERS ARE INJURED. IT SI ESTIMATED THAT EACH YEAR, 1, 80,000 WORKERS MEET THEIR DEATH AND 110 MILLION WERE INJURED DUE TO OCCUPATIONAL HAZARDS.

AS PER THE INTERNATIONAL COUNCIL OF NURSES (INC) THE FUNDAMENTAL RESPONSIBILITY

OF THE NURSE IS TO PROMOTE HEALTH, PREVENT ILLNESS, AND RESTORE HEALTH AND TO ALLEVIATE SUFFERING. INHERENT IN NURSING IS UNIVERSAL, IRRESPECTIVE OF RACE, CASTE, CREED AND SOCIAL STATUS. NURSES RENDER HEALTH CARE SERVICES TO INDIVIDUAL, THE FAMILY AND THE COMMUNITY.

THE NUMBER OF STUDIES AVAILABLE IN THESE FIELDS HAS REVEALED THE MAGNITUDE AND DEPTH OF OCCUPATIONAL HEALTH PROBLEMS, MOTIVATING THE OCCUPATIONAL HEALTH PROFESSIONALS TO WORKOUT APPROPRIATE INTERVENTION STRATEGIES, TO MINIMIZE OCCUPATIONAL HEALTH PROBLEMS, AS TO MINIMIZE THE PRODUCTIVITY LOSS AND TOTAL WELLBEING OF THE LABOUR WORK FORCE.

IN NAMAKKAL AREA THERE ARE NEARLY ABOUT 3214 DYEING, COTTON AND CEMENT INDUSTRIES WHICH ARE HELPFUL FOR THE PEOPLE TO GET AN EMPLOYMENT OPPORTUNITY VERY EASILY. ON THE OTHER HAND PEOPLE WERE EASILY ATTACKED WITH RESPIRATORY PROBLEMS DUE TO THESE INDUSTRIES.

IN THE LIGHT OF THE ABOVE, RECOGNIZING THE MAGNITUDE OF THE RESPIRATORY HEALTH PROBLEMS AND THE LEVEL OF EXPOSURE TO DYEING, COTTON AND CEMENT FACTORY WORKERS THE INVESTIGATOR FELT THE NEED TO ASSESS THE RESPIRATORY HEALTH OF THESE WORKERS. FURTHER THE INVESTIGATOR REALIZES THE IMPORTANCE OF UTILISING THE PERSONAL SAFETY MEASURES DURING WORKING HOURS BY THE WORKERS.

STATEMENT OF THE PROBLEM

A comparative study to assess respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.

OBJECTIVES

1. To compare the respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.
2. To find out the association between the respiratory health and selected background factors among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.

HYPOTHESES

H_1 : There will be a significant difference in the respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.

H_2 : There will be a significant association between the respiratory health and selected background factors among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.

OPERATIONAL DEFINITION

1) Respiratory health: Refers to the verbal response of the workers on health status related to respiratory tract. Respiratory health was measured in terms of respiratory health scores based on the items in the interview schedule. It was measured in terms of the presence of respiratory problems.

2) Dyeing workers: Refers to the male workers who are working in the textile dyeing industry and those who fulfilled sampling criteria.

3) Cotton mill workers: Refers to the male workers who are working in the cotton mill and those who fulfilled sampling criteria.

4) Cement workers: Refers to the male workers who are working in the cement factory and those who fulfilled sampling criteria.

ASSUMPTIONS

1. Dyeing, Cotton and Cement factory workers will be willing to participate in the study
2. Tool prepared for the study would be sufficient for collecting information regarding the respiratory health.
3. The information shared by the workers will be true measures of respiratory health.

DELIMITATIONS

The study will be delimited to,

1. Dyeing, Cotton and Cement factory workers from selected areas of Namakkal, TN.
2. Four weeks of data collection.
3. Data collected through interview schedule.
4. Samples selected by convenient sampling method.

CONCEPTUAL FRAMEWORK

A conceptual framework is a group of concepts and set of propositions that spells out the relationship between them. It plays several interrelated roles in the progress of science.

Polit and Hugler (1995) states that a conceptual framework is interrelated concepts or abstractions that are assembled together in some rational scheme by the virtue of their relevance to a common theme.

Epidemiological triad: The epidemiological triad explains that when the agent, host and environment factors interact disease or illness is caused. Exposure to Textile dyeing chemicals, cotton and cement dust in an susceptible person and may result in clinical disease. Not everyone exposed develops the disease. There are other factors relating to the host and environment, which are equally important to determine whether or not disease will occur in exposed host. This demands broader concept of disease causation that synthesizes the basic factors of interaction of agent, host and environment. In the present study, the multiplicity of interaction between agent, host and environment factors affect the respiratory health of the male workers among selected Dyeing, Cotton and Cement factory workers.

Agent factors: The first link in the chain of disease is agent. The disease agent is defined as a substance living or non living or a force, tangible or intangible, the excessive pressure or relative lack of which may initiate or perpetuate a disease process. A disease may have a single agent, a number of independent alternative agents or a complex of two or more factors whose combined presence is essential for the development of disease.

In the present study, agent factors refer to the exposure to dyeing chemicals, cotton and cement dust.

Host factors: In epidemiological terminology the human host is referred to soil and the disease agent as seed. In some situations, host factors play a major role in determining the outcome of an individual exposure to disease.

In the present study, host factors refers to Age, Body Mass Index, Literacy status, Working hours, Marital status, Residential status, Medical check up, Diseases, Habits, Chest circumference and Personal safety measures.

Environment Factors: The external or macro environment is defined as “All that which is external to the individual human host, living and non -living and with which he is in constant interaction.”

The present study environment factors refer to place of work; here it refers to the industry or the factory, exhaust ventilation.

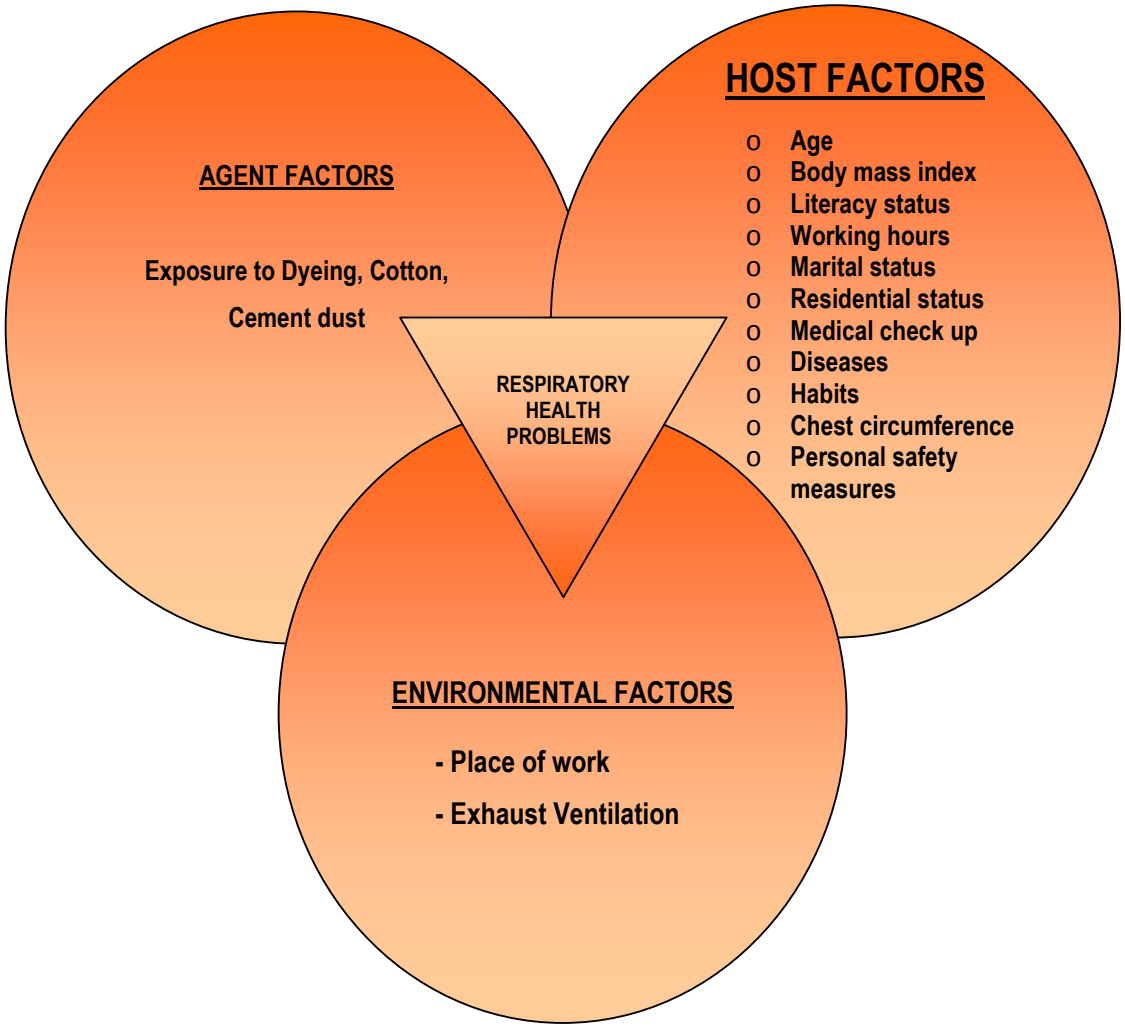

Fig. 1: CONCEPTUAL FRAME WORK BASED ON EPIDIEMIOLOGICAL TRAID

CHAPTER – II

REVIEW OF LITERATURE

Polit (2003) states that literature review is a critical summary of research on a topic of interest, often prepared to put a research problem in context.

Review of literature helps in identification of Research problem and development or refinement of research question. It gives an orientation to what is known and not known about an area of injury. And also review of literature helps to determine any gap or inconsistency in body of research and to develop an evidenced based practice.

The literatures reviewed are presented under the following sections

I. Studies related to Respiratory Health among dyeing factory workers
II. Studies related to Respiratory Health among Cotton Mill workers
III. Studies related to Respiratory Health among Cement factory workers.

I. STUDIES RELATED TO RESPIRATORY HEALTH AMONG DYEING FACTORY WORKERS

Koh DH, et.al., (2008), conducted a study to examine the relationship between asthma mortality and occupational exposure in the dye industry. The study comprises 66,089 male workers, including 904 workers in the dye industry, who underwent medical examinations. Deaths were also observed during the 1995 to 2003 period. The mortality was analyzed using the standardized mortality ratio (SMR) and the mortalities from asthma in dyeing workers were compared using the standardized rate ratio (SRR). The mortality in dye industry workers was

significantly lower than in the general population (SMR=0.40, 95% CI 0.24-0.63), while the asthma mortality (SMR=9.03, 95% CI 1.86-26.39) was significantly higher. Deaths from non-malignant respiratory diseases were higher in dye industry workers.

DONBAK ET.AL., (2005), **CONDUCTED A STUDY TO EVALUATE THE GENOTOXIC RISK OF WORKERS FROM TEXTILE DYEING PLANTS IN KAHRAMANMARAS, TURKEY. THE STUDY COMPRISES OF 40 WORKERS AND COMPARED TO THOSE OF 32 AGE-, SEX-, AND HABIT-MATCHED HEALTHY CONTROLS. GROUPS WERE SELECTED AFTER A QUESTIONNAIRE ADMINISTRATION. USE OF MARAS POWDER (A KIND OF SMOKELESS TOBACCO) WAS CONSIDERED AS MODULATING FACTOR. THE SCES LEVEL DID NOT SHOW SIGNIFICANT DIFFERENCES BETWEEN WORKERS AND CONTROLS. THE FREQUENCY OF CA WAS SIGNIFICANTLY HIGHER IN WORKERS THAN IN CONTROLS. USE OF MARAS POWDER WAS A SIGNIFICANT FACTOR TO INCREASE**

THE FREQUENCIES OF SCE AND CA IN CONTROL GROUP. THE LEVEL OF SCE AND CA DID NOT CORRELATE WITH THE AGE WHEREAS THERE WAS A SIGNIFICANT CORRELATION BETWEEN YEARS OF EXPOSURE AND CA FREQUENCY. THE STUDY REVEALES THAT THERE IS A RISK OF GENOTOXICITY TO THE TEXTILE DYEING WORKERS.

SINGH MB ET.AL., (2005), **CONDUCTED A STUDY TO EXPLORE THE OCCUPATIONAL HEALTH PROBLEMS OF THE DESERT TEXTILE WORKERS AND THEIR ASSOCIATION WITH NUTRITION AND ENVIRONMENTAL FACTORS, INVESTIGATIONS WERE CARRIED-OUT IN TWO DISTRICTS, JODHPUR AND PALI. THE STUDY COMPRISE OF 1,240 INDIVIDUALS OUT OF WHICH 845 WERE TEXTILE WORKERS AND 395 WERE COMPARATIVE GROUP WORKERS OF THE SAME AGE GROUPS. THE MAIN DISEASE**

CONDITIONS, I.E. ACHES (19.4%), RESPIRATORY (12.1%) AND FEVER (7.7%), WERE HIGHER IN TEXTILE WORKERS THAN THE COMPARATIVE GROUP. DYEING GROUP WORKERS SUFFERED THE MOST (25.5%) FROM ACHES, SIGNIFICANTLY HIGHER THAN THE COMPARATIVE GROUP (11.6%). PRINTING AND BLEACHING GROUP WORKERS SUFFERED FROM RESPIRATORY PROBLEMS (15.5%) ALMOST TWICE AS MUCH AS THE COMPARATIVE GROUP, POSSIBLY DUE TO EXPOSURE TO FUMES OF ACIDS AND USE OF CHEMICAL DYES. HOUSING CONDITIONS, PERSONAL HYGIENE AND EDUCATION SHOWED NEGATIVE ASSOCIATIONS WITH DISEASE CONDITIONS BUT POSITIVE ASSOCIATIONS WITH ANAEMIA. THE STUDY REVEALED THAT IN THE TEXTILE INDUSTRY, DISEASE CONDITIONS VARY WITH THE CATEGORIZATION OF WORK.

SATHIAKUMAR ET.AL., (2001), **CONDUCTED A STUDY TO EVALUATE THE MORTALITY EXPERIENCE OF WORKERS AT A DYE AND RESIN PLANT IN NEW JERSEY. THE RETROSPECTIVE FOLLOW-UP STUDY INCLUDED 3266 WORKERS EMPLOYED FOR AT LEAST 6 MONTHS AT THE PLANT. ANALYSES USED STANDARDIZED MORTALITY RATIO (SMRS) TO COMPARE THE COHORT'S CAUSE-SPECIFIC MORTALITY RATES DURING 1952 TO 1995 WITH THE RATES OF THE NEW JERSEY POPULATION. THERE WERE FEWER THAN EXPECTED DEATHS FROM ALL CAUSES COMBINED (728 OBSERVED VS 810 EXPECTED) AND SIMILAR NUMBERS OF OBSERVED AND EXPECTED CANCER DEATHS (225 VS 232). STATISTICALLY SIGNIFICANT WORK AREA-SPECIFIC CANCER EXCESSES WERE LIMITED TO WHITE MEN AND INCLUDED AN EXCESS OF LUNG CANCER IN MAINTENANCE WORKERS (40 OBSERVED VS 26**

EXPECTED; SMR, 153; 95% CONFIDENCE INTERVAL [CI], 109 TO 208) AND IN SOUTH DYES WORKERS (32 OBSERVED VS 19 EXPECTED; SMR, 168; CI, 115 TO 237) AND AN EXCESS OF STOMACH CANCER (5 OBSERVED VS 1.3 EXPECTED; SMR, 386; CI, 125 TO 901), BLADDER CANCER (4 OBSERVED VS 0.8 EXPECTED; SMR, 515; CI, 140 TO 1318) AND CENTRAL NERVOUS SYSTEM CANCER (5 OBSERVED VS 1 EXPECTED; SMR, 517; CI, 168 TO 1206) IN NORTH DYES WORKERS.

ZUSKIN E ET.AL., (1997), **CONDUCTED A STUDY TO ASSESS PREVALENCE OF ACUTE AND CHRONIC RESPIRATORY SYMPTOMS AND LUNG FUNCTION CHANGES. THE STUDY COMPRISE OF 135 TEXTILE DYEING WORKERS. A STANDARDIZED QUESTIONNAIRE WAS USED TO ELICIT THE RESPIRATORY SYMPTOMS. IN ADDITION, 103 NON-**

EXPOSED CONTROL WORKERS WERE STUDIED. THE PREVALENCE OF ALL CHRONIC RESPIRATORY SYMPTOMS WAS SIGNIFICANTLY HIGHER IN THE EXPOSED THAN IN THE CONTROL WORKERS; IN PARTICULAR, THE PREVALENCE OF OCCUPATIONAL ASTHMA WAS 6%. IN WORKERS EXPOSED FOR > 10 YEARS, THERE WAS SIGNIFICANTLY HIGHER PREVALENCE OF CHRONIC COUGH, CHRONIC PHLEGM, AND CHRONIC BRONCHITIS IN SMOKERS THAN IN NON-SMOKERS (P < 0.01). A HIGH PREVALENCE OF SHIFT-RELATED SYMPTOMS WAS FOUND IN EXPOSED WORKERS. SIGNIFICANT ACROSS-SHIFT REDUCTIONS OF VENTILATORY CAPACITY TESTS WERE DOCUMENTED IN THIS COHORT AND VARIED FROM AN AVERAGE OF 4.0% FOR FVC TO 14.2% FOR FEF25. THIS DATA SUGGEST THAT TEXTILE DYEING WORKERS DEVELOP ACUTE

AND CHRONIC RESPIRATORY IMPAIRMENT AS A RESULT OF THEIR EXPOSURES.

II. STUDIES RELATED TO RESPIRATORY HEALTH AMONG COTTON MILL WORKERS

TORBEN SIGSGAARD ET.AL., (2007), **CONDUCTED A CROSS-SECTIONAL STUDY TO SURVEY RESPIRATORY SYMPTOMS THROUGHOUT THE TEXTILE INDUSTRY. WORKERS AT COTTON MILLS, A WOOL MILL, AND A MAN-MADE FIBER (MMF) MILL WERE EXAMINED. FOUR HUNDRED AND NINE WORKERS PARTICIPATED IN THIS SURVEY, I.E., 253, 62, AND 94 WORKERS AT THE COTTON MILLS, THE WOOL MILL, AND THE MMF MILL, RESPECTIVELY. AN INTERVIEW METHOD WAS USED TO ASSESS THE PREVALENCE OF COMMON RESPIRATORY SYMPTOMS. LUNG FUNCTION MEASUREMENTS DETERMINED A BASELINE FEV_1, FVC AND THE CHANGE IN FEV_1 AND FVC DURING WORK HOURS ON A MONDAY. THE MEAN PERSONAL SAMPLES OF**

AIRBORNE RESPIRABLE DUST AND RESPIRABLE ENDOTOXIN WERE HIGHEST IN THE COTTON INDUSTRY, I.E., 0.17–0.50 MG/M^3 AND 9.0–126 MG/M^3 RESPECTIVELY. THE MEAN CHANGE IN FEV$_1$% AND FVC% WAS GREATEST AMONG ATOPIC INDIVIDUALS IN BOTH COTTON AND WOOL INDUSTRY AND OTHER TEXTILE INDUSTRIES. BYSSINOSIS WAS DIAGNOSED ONLY IN THE COTTON INDUSTRY.

EISEN ET.AL., (2003), **CONDUCTED A STUDY TO DETERMINE CHRONIC EFFECTS OF LONG TERM EXPOSURE TO COTTON DUST AND ENDOTOXIN ON INCIDENCE OF RESPIRATORY SYMPTOMS AND THE EFFECT OF CESSATION OF EXPOSURE. RESPIRATORY HEALTH IN 429 CHINESE COTTON TEXTILE WORKERS (STUDY GROUP) AND 449 SILK TEXTILE WORKERS (CONTROL GROUP) WAS FOLLOWED PROSPECTIVELY FROM 1981 TO 1996.**

BYSSINOSIS, CHEST TIGHTNESS, AND NON-SPECIFIC RESPIRATORY SYMPTOMS WERE ASSESSED BY MEANS OF IDENTICAL STANDARDISED QUESTIONNAIRES AT FOUR TIME POINTS. EXPOSURES TO COTTON DUST AND ENDOTOXIN WERE ESTIMATED USING AREA SAMPLES COLLECTED AT EACH SURVEY. AMONG COTTON WORKERS, THE CUMULATIVE INCIDENCE OF BYSSINOSIS AND CHEST TIGHTNESS WAS 24% AND 23%, RESPECTIVELY, AND WAS SIGNIFICANTLY MORE COMMON IN SMOKERS THAN IN NON-SMOKERS. AMONG SILK WORKERS, NO TYPICAL BYSSINOSIS WAS IDENTIFIED. CHRONIC EXPOSURE TO COTTON DUST IS RELATED TO BOTH WORK SPECIFIC AND NON-SPECIFIC RESPIRATORY SYMPTOMS. THIS STUDY REVEALS THAT BYSSINOSIS IS MORE STRONGLY ASSOCIATED WITH EXPOSURE TO ENDOTOXIN THAN TO DUST.

BASEL K.A.(2002), **CONDUCTED A STUDY TO DETERMINE THE EFFECTS OF PAST COTTON DUST EXPOSURE ON THE RESPIRATORY TRACT; A TOTAL OF 223 PERSONS WORKING IN A COTTON MILL WERE INCLUDED IN THE STUDY. A QUESTIONNAIRE WAS USED TO ENQUIRE ABOUT RESPIRATORY SYMPTOMS. PARTICIPANTS UNDERWENT SEVERAL SPIROMETRIC MEASUREMENTS. THE MOST RESPIRATORY SYMPTOM WAS CHEST TIGHTNESS (20.3%), THE PREVALENCE OF BYSSINOSIS WAS 14.2% IN COTTON PROCESSING WORKERS. AMONG THESE CASES, 28.6% HAD SYMPTOMS ON THE 1ST DAY OF THE WEEK, AND 71.4% HAD SYMPTOMS SEEN IN 53.6% OF THE WORKERS WITH BYSSINOSIS MEAN RESPIRABLE DUST LEVELS WERE BETWEEN 0.095 AND 0.413 MG/M3.**

XIAO-RONG WANG ET.AL., (2002), **CONDUCTED A STUDY TO INVESTIGATE ADVERSE EFFECTS OF EXPOSURE TO COTTON DUST ON RESPIRATORY HEALTH. 225 NEWLY-HIRED TEXTILE WORKERS WERE ASSESSED AT WORK INITIATION, AND AT THREE AND TWELVE MONTHS LATER TO IDENTIFY EARLY PULMONARY RESPONSES TO COTTON DUST EXPOSURE. SYMPTOM INCIDENCE AT THREE MONTHS WAS 3.6% FOR USUAL COUGH WITH PHLEGM, AND 6.7% FOR USUAL DRY COUGH. LUNG FUNCTION CHANGES WERE DETECTABLE AT ONE YEAR: FEV_1 DECLINED BY 70 ML AND FVC BY 124 ML OVER THE YEAR, AND WORKERS REPORTING RESPIRATORY SYMPTOMS AT THREE MONTHS SHOWED A SIGNIFICANTLY GREATER CROSS-SHIFT DROP IN FEV_1 (−2.3%) THAN THOSE WITHOUT THE SYMPTOMS (−0.7%).THESE RESULTS SUGGEST THAT THE OCCURRENCE OF RESPIRATORY SYMPTOMS**

REPRESENTS THE EARLIEST RESPONSE TO COTTON DUST EXPOSURE, FOLLOWED BY LUNG FUNCTION CHANGES.

DAVID C. CHRISTIANI ET.AL., (2001), **CONDUCTED A STUDY TO EVALUATE THE CHRONIC EFFECTS OF EXPOSURE TO COTTON DUST; A 15-YR FOLLOW-UP STUDY IN COTTON TEXTILE WORKERS WAS PERFORMED IN SHANGHAI, CHINA FROM 1981 TO 1996. TESTING OCCURRED FOUR TIMES DURING THE 15-YR PERIOD. THE ACHIEVED FOLLOW-UP RATES WERE 76-88% OF THE ORIGINAL 447 COTTON TEXTILE WORKERS, AND 70-85% OF THE ORIGINAL 472 SILK TEXTILE WORKERS (AS A CONTROL GROUP). A QUESTIONNAIRE WAS USED TO ASSESS THE PREVALENCE OF BYSSINOSIS. THE PREVALENCE OF BYSSINOSIS INCREASED OVER TIME IN COTTON WORKERS, WITH 15.3% AT THE**

LAST SURVEY VERSUS 7.6% AT THE BASELINE, WHEREAS NO BYSSINOSIS WAS FOUND IN SILK WORKERS. MORE WORKERS IN THE COTTON GROUP CONSISTENTLY REPORTED SYMPTOMS THAN IN THE SILK GROUP. COTTON WORKERS HAD SMALL, BUT SIGNIFICANTLY GREATER, ADJUSTED ANNUAL DECLINES IN FEV_1 AND FVC THAN DID THE SILK WORKERS. LONG-TERM EXPOSURE TO COTTON DUST IS ASSOCIATED WITH CHRONIC OR PERMANENT OBSTRUCTIVE IMPAIRMENTS.

LOVE ET.AL., (2001), **CONDUCTED A STUDY TO DETERMINE RELATIONS BETWEEN RESPIRATORY SYMPTOMS AND EXPOSURE TO INSPIRABLE WOOL MILL DUST. A QUESTIONNAIRE WAS USED ON 385 WORKERS TO ELICIT THE COMMON RESPIRATORY SYMPTOMS. AN ENVIRONMENTAL SURVEY WAS CARRIED OUT AT EACH MILL, WHICH INCLUDED 629**

MEASUREMENTS OF INSPIRABLE DUST, ENABLING ESTIMATES TO BE MADE OF THE AIRBORNE CONCENTRATIONS OF INSPIRABLE DUST USUALLY EXPERIENCED BY EACH MEMBER OF THE WORKFORCE UNDER CURRENT CONDITIONS. OVERALL SYMPTOM PREVALENCES WERE: PERSISTENT COUGH AND PHLEGM, 9%; WHEEZE, 31%; BREATHLESSNESS ON WALKING WITH OTHERS ON LEVEL GROUND, 10%; PERSISTENT RHINITIS, 18%; PERSISTENT CONJUNCTIVITIS, 10%; PERSISTENT CHILLS, 2%; TEN OR MORE NOSEBLEEDS A YEAR, 2%; AND THREE OR MORE CHEST ILLNESSES IN PAST THREE YEARS, 5%. RELATIVE RISKS OF EACH SYMPTOM IN RELATION TO INSPIRABLE DUST CONCENTRATIONS WERE CALCULATED BY MEANS OF A LOGISTIC REGRESSION ANALYSIS. THIS STUDY REVEALS THAT IT IS ASSOCIATED WITH FUNCTIONAL IMPAIRMENT OF THE LUNGS.

MIRNALINI C. ZODPEY. P (2000), **CONDUCTED A CROSS-SECTIONAL STUDY AMONG 514 COTTON TEXTILE WORKERS. ALL THE STUDY SUBJECTS WERE MALES. MAJORITY OF THE WORKERS BELONGED TO AGE GROUP 25-35 YEARS(68.1%) AND LOWER SOCIO-ECONOMIC STRATA(78.4%) ACCORDING TO MODIFIED KUPPUSWAMY'S MAJORITY OF THE WORKERS HAD AN EDUCATIONAL STATUS UP TO PRIMARY SCHOOL LEVEL (42.2%) AND MAJORITY (65.2%) WERE WORKING FOR LAST 5-10 YEARS. MEAN HEIGHT OF SUBJECTS WERE 164.8CM AND MEAN WEIGHT WAS 57.3 KG. THE COMMON MORBID CONDITIONS INCLUDED, BYSSINOSIS (2.3%), CHRONIC BRONCHITIS(4.5%) AND UPPER RESPIRATORY TRACT INFECTION (7.2%).**

III. STUDIES RELATED TO RESPIRATORY HEALTH AMONG CEMENT FACTORY WORKERS.

Zeyede K Zelek et.al., (2010), conducted a study to investigate the associations between current "total" dust exposure and acute respiratory symptoms and respiratory function among cement factory workers. The study comprises of 40 exposed production workers from the crusher and packing sections and 20 controls from the guards were included. Personal "total" dust was measured in the workers' breathing zone and peak expiratory flow (PEF) was measured for all selected workers before and after the shift. When the day shift ended, the acute respiratory symptoms experienced were scored and recorded on a five-point Likert scale using a modified respiratory symptom score questionnaire. The highest geometric mean dust exposure was found in the crusher section (38.6 mg/m3) followed by the packing section (18.5 mg/m3) and the guards (0.4 mg/m3). Multiple linear regressions showed a significant negative association between the percentage cross-shift change in PEF and total dust exposure. Total cement dust exposure was related to acute respiratory symptoms and acute ventilatory effects.

Masoud Neghab et.al., (2007), conducted a study to examine the effects of occupational exposure to cement dust on the respiratory system. The study comprise of 88, randomly selected, male workers who were exposed to cement dust and 80 healthy male office workers exposed to dust that served as the referent group. Subjects were interviewed and were given respiratory symptom questionnaires to answer. Levels of exposures to inhalable and respirable cement dust were estimated to be 53.4 ± 42.6 and 26 ± 14.2 mg/m3, respectively (Mean ± SD). Statistical analysis of the data revealed that symptoms like regular cough, phlegm, wheezing and shortness of breath were significantly ($p<0.05$) more prevalent among

exposed workers. The study reveals that exposure to cement dust is associated with respiratory symptoms and functional impairments.

MIRZAEE ET.AL., (2007), **CONDUCTED A STUDY TO ASSESS CEMENT DUST EXPOSURE AND ITS RELATIONSHIP TO RESPIRATORY HEALTH EFFECTSTHE STUDY COMPRISE OF 170 EXPOSED AND 170 UNEXPOSED EMPLOYEES WERE SELECTED. AN INTERVIEWER-ADMINISTERED QUESTIONNAIRE WAS USED AND MEASUREMENTS OF LUNG FUNCTION WERE MADE USING A SPIROMETER IN BOTH GROUPS. CONCENTRATIONS OF PERSONAL RESPIRABLE DUST RANGED FROM 3.7 MG/M^3 IN THE KILNS TO 23 MG/M^3 IN THE ORE CRUSHING AREA, AND TOTAL DUST RANGED FROM 15 MG/M^3 IN THE KILNS TO 95 MG/M^3. COUGH AND PHLEGM, WITH OR WITHOUT SHORTNESS OF BREATH, WERE SIGNIFICANTLY RELATED TO DUST CONCENTRATION. MEASURING PULMONARY FUNCTIONS OF WORKERS EXPOSED TO DUST AND UNEXPOSED GROUP**

SHOWED A SIGNIFICANT DECREASE IN VITAL CAPACITY, FORCED VITAL CAPACITY, FEF_{25-75} AND FORCED EXPIRATORY VOLUME IN THE FIRST SECOND ($P<0.05$). FINDINGS SUGGEST THAT CEMENT DUST MAY LEAD TO HIGHER PREVALENCE OF RESPIRATORY SYMPTOMS AND THE REDUCTION OF VENTILATOR CAPACITY. THE STUDY REVEALED THAT CEMENT DUST EXPOSURE IS ASSOCIATED WITH ACUTE AS WELL AS CHRONIC RESPIRATORY HEALTH EFFECTS.

ANNE KRISTIN MOLLER ET.AL., (2003), **CONDUCTED A STUDY TO ASSOCIATE BETWEEN EXPOSURE TO CEMENT DUST AND RESPIRATORY EFFECTS. A TOTAL OF 119 WORKERS FROM THE LARGEST CEMENT PLANT IN NORWAY AND 50 WORKERS FROM A NEARBY CONTROL PLANT WERE SELECTED FOR THE STUDY. SPIROMETRY WAS USED**

FOR MEASURING LUNG FUNCTIONS. THE ESTIMATED POWER TO DETECT A TRUE DIFFERENCE BETWEEN FORCED EXPIRATORY VOLUMES IN ONE SECOND (FEV_1) IN THE TWO GROUPS OF 0.3L WAS 0.90, ASSUMING 95% SIGNIFICANCE LEVEL. THE PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE WAS 14.3% IN THE EXPOSED GROUP AND 14.0% AMONG THE CONTROLS. THESE FINDINGS DO NOT SUPPORT THE HYPOTHESIS THAT CEMENT DUST EXPOSURE HAS A NEGATIVE IMPACT ON LUNG FUNCTION OR GIVES AN INCREASE IN RESPIRATORY SYMPTOMS.

OMER A EL BADRI ET.AL., (2003), **CONDUCTED A STUDY TO ASSESS THE EFFECT OF EXPOSURE TO CEMENT DUST ON LUNG FUNCTION IN FACTORY WORKERS AT ATBARA CEMENT FACTORY. FORTY WORKERS EMPLOYED FOR AT LEAST 3 YEARS AND**

FORTY CONTROLS (NON EXPOSED) WERE SELECTED. SPIROMETER AND WRIGHTS PEAK FLOW METER WERE USED FOR MEASURING LUNG FUNCTIONS. STATISTICALLY, SIGNIFICANT REDUCTION IN FVC, FEV1 AND PEFR WERE FOUND IN EXPOSED WORKERS WHEN COMPARED TO CONTROL. THE FEV1/FVC RATIO, ALTHOUGH WAS LESS IN EXPOSED WORKERS, THE DIFFERENCE WAS FOUND TO BE INSIGNIFICANT. LUNG FUNCTION INDICES WERE FOUND TO BE REDUCED WITH INCREASING DURATION OF EXPOSURE TO CEMENT DUST.

JULIUS M WAISELAGE ET.AL., (2001), **CONDUCTED A STUDY ON THE EFFECT OF CEMENT DUST EXPOSURE ON ACUTE RESPIRATORY HEALTH, AND WAS ASSESSED AMONG 51 HIGH EXPOSED AND 33 LOW EXPOSED CEMENT WORKERS. A**

STRUCTURED QUESTIONNAIRE WAS USED TO MEASURE ACUTE RESPIRATORY SYMPTOMS. PEAK EXPIRATORY FLOW (PEF) WAS MEASURED PRESHIFT AND POST SHIFT FOR EACH WORKER WITH A MINI-WRIGHT PEF METER. GEOMETRIC MEANS OF PERSONAL RESPIRABLE DUST AND TOTAL DUST AMONG HIGH EXPOSED WERE 4.0 AND 13.2 MG/M^3, RESPECTIVELY, AND 0.7 AND 1.0 MG/M^3 AMONG LOW EXPOSED. MEAN PERCENTAGE CROSS-SHIFT DECREASE IN PEF WAS SIGNIFICANTLY MORE PRONOUNCED AMONG HIGH EXPOSED WORKERS THAN LOW EXPOSED (95% CI 1.1, 6.1%). THE OBSERVED ACUTE RESPIRATORY HEALTH EFFECTS AMONG THE WORKERS ARE MOST LIKELY DUE TO EXPOSURE TO HIGH CONCENTRATIONS OF IRRITANT CEMENT DUST.

YI AL-NEAIMI ET.AL., (2001), **CONDUCTED A STUDY ON CHRONIC EXPOSURE TO CEMENT DUST AND THE EFFECT OF RESPIRATORY HEALTH AND VENTILATORY CAPACITY. A QUESTIONNAIRE WAS USED TO COLLECT INFORMATION ON SOCIO-DEMOGRAPHIC CHARACTERISTICS, SMOKING PROFILE AND HISTORY OF RESPIRATORY HEALTH. PULMONARY FUNCTION WAS ASSESSED AND PULMONARY FUNCTION IMPAIRMENT WAS CALCULATED FOR THE EXPOSED AND THE UNEXPOSED WORKERS. A HIGHER PERCENTAGE OF THE EXPOSED WORKERS REPORTED RECURRENT AND PROLONGED COUGH (30%), PHLEGM (25%), WHEEZE (8%), DYSPNOEA (21%), BRONCHITIS (13%), SINUSITIS (27%), SHORTNESS OF BREATH (8%) AND BRONCHIAL ASTHMA (6%). AMONG THE UNEXPOSED, PREVALENCES OF THESE SYMPTOMS WERE 10, 5, 3, 5, 4, 11, 4 AND 3%, RESPECTIVELY. VENTILATORY**

FUNCTION (VC, FVC, FEV(1), FEV(1)/VC, FEV(1)/FVC AND PEF) WAS SIGNIFICANTLY LOWER IN THE EXPOSED WORKERS COMPARED WITH UNEXPOSED WORKERS. THE STUDY REVEALS THAT RESPIRATORY HEALTH EFFECTS OBSERVED AMONG CEMENT WORKERS COULD NOT BE EXPLAINED BY AGE, BMI AND SMOKING, AND WERE PROBABLY CAUSED BY EXPOSURE TO CEMENT DUST.

CHAPTER – III

METHODOLOGY

In this chapter, the researcher intended to discuss the research design, research setting, population, sample and sample size, sampling technique, sampling criteria, description of tools, content validity, reliability, pilot study, data collection procedure, the plan for data analysis and ethical issues.

The study was a comparative study on respiratory health of the Dyeing, Cotton and Cement factory workers.

RESEARCH DESIGN

The research design selected for the study was a comparative study, descriptive in nature. Respiratory health of the Dyeing, Cotton and Cement factory workers was measured

using semi- structured interview and observation methods. In a comparative design two or more groups are compared with regard to a specific phenomenon.

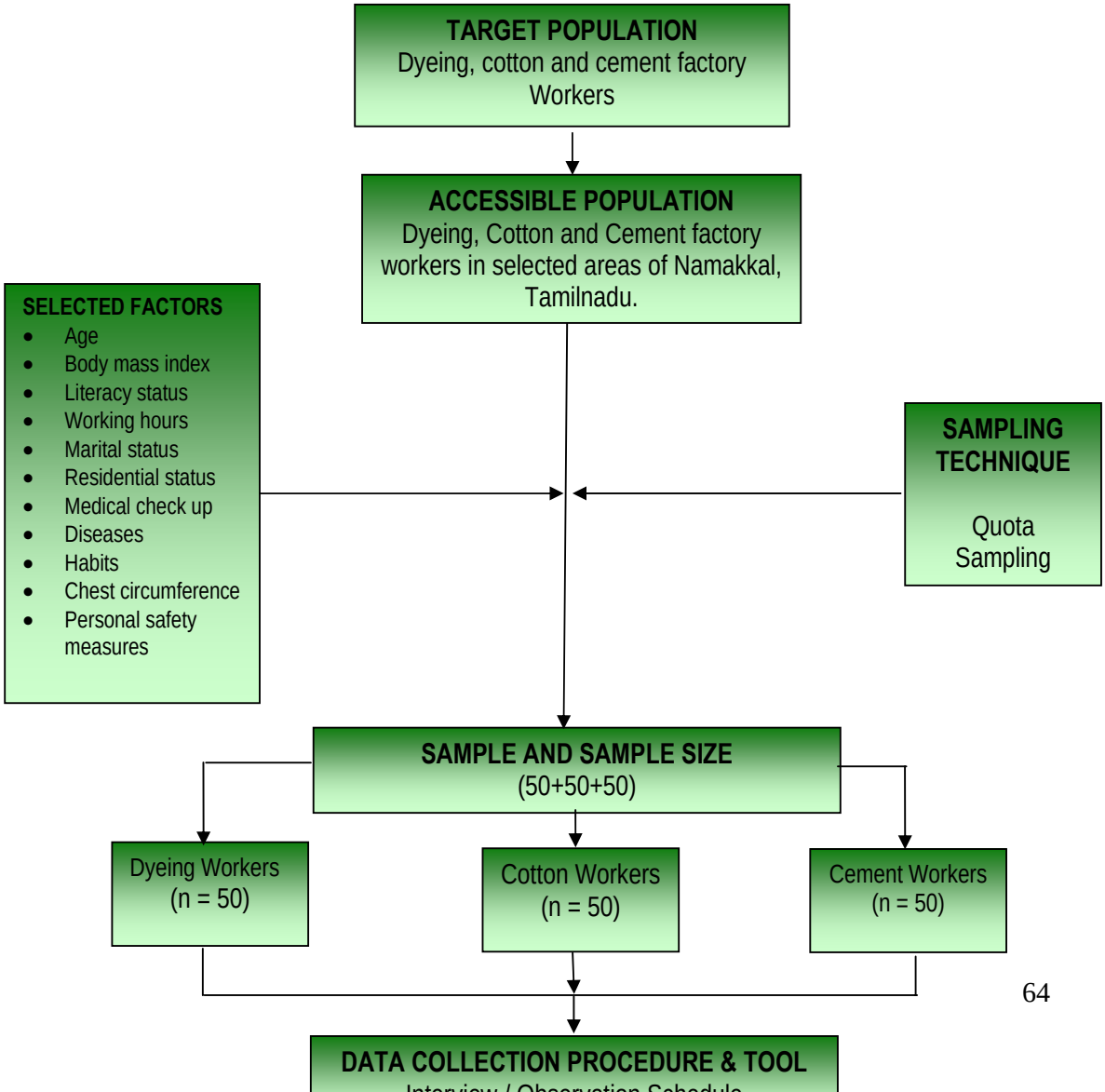

Fig: 2 SCHEMATIC REPRESENTATION OF RESEARCH DESIGN

VARIABLES

Variables and characteristics are attributes that vary or differ among the persons or objects being studied. The dependent variables included in the study were respiratory health of dyeing, cotton and cement workers.

SETTING OF THE STUDY

The selection of the setting was done on the basis of feasibility of conducting the study, availability of subjects and permission from the authority. This study was conducted in cement factory, cotton mill and dyeing factories in selected areas of Namakkal, TN.

POPULATION

The target population in the present study was dyeing, cotton and cement factory workers. The accessible population for the present study was cement, cotton and dyeing factory workers who fulfill the sampling criteria in selected areas of Namakkal, TN.

SAMPLE AND SAMPLE SIZE

A sample is a section of population that has been selected to represent the population. The sample consisted of 50 cement workers, 50 cotton workers and 50 dyeing factory workers. The sample size of the study was 150 workers.

SAMPLING TECHNIQUE

Quota sampling method was used to select the samples in the present study. All the cement cotton and dyeing workers who were between 20 years and 50 years were included in the study.

SAMPLING CRITERIA

In sampling criteria the researcher specifies the characteristics of the population under the study by the dealing the inclusion and exclusion. Inclusion criteria are possessed to be included in the sample. Exclusion criteria are characteristics that the participant may possess that could confound the result o the study; therefore they are excluded from participating in the study.

a) Inclusion Criteria

1. Dyeing, Cotton and Cement factory workers who are aged between 20-50 years of age.
2. Workers who were available during data collection.
3. Male workers.

b) Exclusion Criteria

1. Workers who are not willing to participate in the study.
2. Female workers of Dyeing, Cotton and Cement factory workers.
3. Workers who were sick during the data collection period.

DEVELOPMENT OF TOOL

A semi-structured interview and observation schedule was prepared based on the past clinical experience of the researcher, related review of literature, and the opinions of the subject experts. For the purpose of the study, the investigator developed a blue print regarding various aspects of respiratory health problems related to Dyeing, Cotton and Cement dust exposure. The tool was translated and used in Tamil language. The average time taken to complete one interview was 30 minutes.

DESCRIPTION OF TOOL

The semi-structured interview schedule had the following sections.

Section-A: Selected factors: This section sought information of selected factors such as age, body mass index, literacy status, working hours, marital status, residential status, medical check-up, any diseases before joining the industry, habits, chest circumference, personal safety measures. There are 11 items.

Section-B: respiratory health questionnaire: This section sought information regarding respiratory health of the dyeing, cotton and cement factory workers such as cough, cough with sputum, Hemoptysis, cough with fever lasting for two weeks, breathing difficulty, breathlessness while at work, grunting, tightness of the chest, nasal drainage, wheezing, pleuritic chest pain, shortness of breath, fatigue, admitted and got treated for respiratory diseases, took medications without the consulting doctor. The section consisted of 15 items.

SCORING

Respiratory problems were measured in terms of respiratory scores. There were totally 15 items on respiratory health responses. The total score was 45. Higher score indicated more respiratory problems and were measured as follows:

Respiratory Problems	*Score*
Never	0
< 3 times in a year	1
3-5 times in a year	2
>5 times in a year	3

CONTENT VALIDITY

The interview schedule constructed by investigator was validated by a community nursing expert, a medical surgical nursing expert, a pulmonologist, and a physician. Suggestions were considered and modification of tool was done according to the opinion of experts. Translation of tool was done by linguist expert and retranslation to English was done and language validity was confirmed.

RELIABILITY OF THE TOOL

Reliability was established by inter-rater method. Twenty samples were chosen from the same setting and the tool was administered by two individuals. Correlation co-efficient was calculated by spearman rank correlation method r= 0.96, was high and the tool was found to be reliable. The samples used for testing reliability were not included in the main study.

PILOT STUDY

The interview method was carried out on 15 quarry workers for clarity, understanding and practicality at Elanthakuttai village. The average time taken for the completion of the questionnaire was 30 minutes. It helped to find out the feasibility of the tool for language clarity, sequence and appropriateness of item and practicality of procedure.

DATA COLLECTION PROCEDURE

Formal approval was obtained from the authorities. The data was collected for 4 weeks in the month of October 2010 among the Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, Tamilnadu. On an average 10 samples participated in the study per day.

Fifty in each Dyeing, Cotton and Cement factories were selected for the study based on sample selection criteria using Quota sampling method. Initial rapport was established and the purpose of the study was explained to them. Informed consent was obtained in the written consent form. Data were collected by interview and observation method at the work set up. Privacy is ensured to the workers. All the subjects were very much co-operative and the investigator expressed a gratitude for their co-operation. The tool was then edited for completion. The average time taken for one client was around 30 minutes.

PLAN FOR DATA ANALYSIS

Data analysis was planned to include both descriptive and inferential statistics. The following plan of analysis was developed.

1. Frequency and percentage distribution was used to describe the background information.

2. Frequency and percentage distribution was used to describe the respiratory health information.
3. Analysis of variance (ANOVA) was used to compare the respiratory health of the Dyeing, Cotton and Cement factory workers.
4. Linear regression was used to find the association between selected back ground factors and the respiratory health of the Dyeing, Cotton and Cement factory workers.

ETHICAL CONSIDERATION

The research problem and objectives were approved by the research committee. Proper explanation regarding the purpose of the study and nature of questionnaire and procedure involved in the study was given. Due permission from the industrial authorities was sought and obtained. Informed and written consent was taken. No physical or psychological harm was caused.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

The analysis and interpretation of data of this study was based on data collected by interview schedule and observation method. The results were computed using descriptive and inferential statistics. The data was entered into the SPSS package version 10 and analyzed. A Probability value of less than 0.05 was considered to be statistically significant.

OBJECTIVES OF THE STUDY

1. To compare the respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, Tamil Nadu.
2. To find out the association between the respiratory health and selected background factors among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, Tamil Nadu.

The data analyzed were presented as follows:

Section 1	:	Data regarding background factors of Dyeing, Cotton and Cement factory workers.
Section 2	:	Data regarding Respiratory health of Dyeing, Cotton and Cement factory workers.
Section 3	:	Data on association between the selected background factors and the respiratory health of the Dyeing, Cotton and Cement factory workers

SECTION – I: DATA ON BACKGROUND VARIABLES OF DYEING, COTTON AND CEMENT FACTORY WORKERS

TABLE – I

Frequency and percentage distribution of selected background factors of Dyeing, Cotton and Cement factory workers

AREAS	Dyeing(n=50)		Cotton(n=50)		Cement(n=50)	
	Frequ-ency	Percen-tage	Frequ-ency	Percen-tage	Frequ-ency	Percen-tage
Age						
20-30years	15	30.0	2	4.0	15	30.0
31-40years	21	42.0	12	24.0	16	32.0
41-50years	14	28.0	36	72.0	19	38.0
Body mass index						
Normal	35	70.0	29	58.0	47	94.0
Obese	10	20.0	17	34.0	3	6.0
Undernourished	5	10.0	4	8.0	0	0
Literacy status						
Can read and write	34	68.0	28	56.0	31	62.0
Cannot read and write	16	32.0	22	44.0	19	38.0
Working hours						
< 8hours	0	0	0	0	0	0
8 hours	13	26.0	50	100	49	98.0
>8 hours	37	74.0	0	0	1	2.0
Marital status						
Single	6	12.0	1	2.0	9	18.0

AREAS	Dyeing(n=50)		Cotton(n=50)		Cement(n=50)	
	Frequ-ency	Percen-tage	Frequ-ency	Percen-tage	Frequ-ency	Percen-tage
Married	44	88.0	48	96.0	41	82.0
Divorced	0	0	1	2.0	0	0
Residential status						
5 km away from the factory	24	48.0	17	34.0	20	40.0
5 km within the factory	36	72.0	33	66.0	30	60.0
Medical check-up						
Once in a year	3	6.0	9	18.0	22	44.0
Every 6 months	5	10.0	10	20.0	6	12.0
Not regular	42	84.0	31	62.0	22	44.0
Diseases before joining work						
Cough with cold	20	40.0	30	60.0	9	18.0
Bronchial asthma	4	8.0	2	4.0	5	10.0
Pulmonary tuberculosis	1	2.0	0	0	1	2.0
None of the above	25	50.0	18	36.0	35	70.0
Habits						
Smoking	1	2.0	5	10.0	12	24.0
Drinking	25	50.0	7	14.0	15	30.0
Both smoking and drinking	7	14.0	27	54.0	13	26.0
None of the above	17	34.0	11	22.0	10	20.0

AREAS	Dyeing(n=50)		Cotton(n=50)		Cement(n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Chest circumference on expiration and inspiration(difference)						
1cm	14	28.0	20	40.0	35	70.0
2cm	18	36.0	16	32.0	10	20.0
3cm	11	22.0	13	26.0	4	8.0
4cm	5	10.0	1	2.0	0	0
5cm	2	4.0	0	0	0	0
6cm	0	0	0	0	1	2.0
Face mask						
Not applicable	2	4.0	0	0	0	0
Never	14	28.0	20	40.0	35	70.0
Rarely	18	32.0	16	32.0	10	20.0
Often	11	22.0	13	26.0	4	8.0
Always	5	10.0	1	2.0	1	2.0
Gloves						
Not applicable	48	96.0	8	16.0	8	16.0
Never	0	0	27	54.0	1	2.0
Rarely	2	4.0	5	10.0	33	66.0
Often	0	0	2	4.0	2	4.0
Always	0	0	8	16.0	6	12.0
Ear plugs						
Not applicable	46	92.0	35	70.0	9	18.0
Never	1	2.0	15	30.0	39	78.0
Rarely	3	6.0	0	0	1	2.0
Often	0	0	0	0	0	0
Always	0	0	0	0	1	2.0

AREAS	Dyeing(n=50)		Cotton(n=50)		Cement(n=50)	
	Frequ-ency	Percen-tage	Frequ-ency	Percen-tage	Frequ-ency	Percen-tage
Footwear/ boots						
Not applicable	49	98.0	11	22.0	41	82.0
Never	0	0	39	78.0	5	10.0
Rarely	0	0	0	0	1	2.0
Often	0	0	0	0	0	0
Always	1	2.0	0	0	3	6.0
Wash face, hands and legs						
Not applicable	12	24.0	19	38.0	0	0
Never	0	0	6	12.0	0	0
Rarely	4	8.0	2	4.0	0	0
Often	8	16.0	1	2.0	1	2.0
Always	26	52.0	22	44.0	49	98.0
Exhaust ventilation						
Not applicable	1	2.0	0	0	0	0
Never	0	0	0	0	0	0
Rarely	0	0	0	0	0	0
Often	0	0	5	10.0	0	0
Always	49	98.0	45	90.0	50	100

Table 1 reveals the frequency and percentage of background variables of Dyeing, Cotton and Cement factory workers.

Regarding **BMI,** majority of Dyeing 35 (70%) are within normal and least are 5 (10%) within undernourished, Cotton 29 (58%) are within normal and least are 4(8%) within undernourished and Cement 47 (94%) are within normal and there are no undernourished workers in the cement factory.

Regarding **literacy,** majority of Dyeing 34 (68%) can read and write and least are 16(32%) cannot read write, Cotton 28 (56%) can read and write and least are 22(44%) cannot read and write and Cement 31 (62%) can read and write and least 19(38%) cannot read and write.

Regarding **working hours,** majority of Dyeing 37 (74%) are working more than 8 hours and (28%) and no one works less than 8hours, all the Cotton mill workers are working 8 hours per day and Cement 49 (98%) are working more than 8 hours and no one works less than 8hours.

Regarding **marital status,** majority of Dyeing 44 (88%) are married and no worker is divorced, Cotton 48 (96%) are married and least 1(2%) is single and divorced and Cement 41 (82%) are married and no worker is divorced.

Regarding **residential status,** majority of Dyeing 36 (72%) are staying within 5km from the mill and least 4(28%) are staying 5km away from the mill, Cotton 33 (66%) are staying within 5km from the factory and the least 17(34%) are staying 5kmaway from the factory and Cement 30(60%) are staying within 5km from the mill and the least 20 (40%) are staying 5km away from the factory.

Regarding **medical check-up,** majority of Dyeing 42 (84%) are not regular in medical check-up and least 3(6%) go once in a year for medical check-up, Cotton 31(62%) are not regular in medical check-up and least 9(18%) go once in a year for medical check-up and Cement 22(44%) go for medical check-up once in a year and 22(44%) are not regular in medical check-up and least 6(12%) go for medical check-up every 6months.

Regarding **chest circumference,** majority of Dyeing 18(36%) are having the difference of 2cm and least 2(4%) are having the difference of 5cm, Cotton 20(40%) are having the

difference of 1cm and least 1(2%) are having the difference of 4cm and Cement 35(70%) are having the difference of 1cm and least 1 (2%) have the difference of 6cm chest circumference on exhalation and inspiration.

Regarding **face mask,** majority of Dyeing 18 (36%) rarely uses face mask and least 2(4%) says that face mask is not applicable, Cotton 20(40%) never uses face mask and least 1(2%) always uses face mask and Cement 35(70%) never uses face mask and least 1(2%) always uses face mask.

Regarding **gloves,** majority of Dyeing 48 (96%) says that gloves are not applicable and least 2(4%) rarely uses gloves, Cotton 27(54%) never uses gloves and least 2(4%) often uses gloves and Cement 33(66%)rarely uses gloves and least 1(2%) never uses gloves.

Regarding **earplugs,** majority of Dyeing 46 (92%) says that earplugs are not applicable and least 1(2%) never uses earplugs, Cotton 35(70%) says that earplugs are not applicable and least 15(30%) never uses earplugs and Cement 39(78%) never uses earplugs and one of them rarely uses earplugs and one of them always uses earplugs.

Regarding **footwear,** majority of Dyeing 49 (98%) says that footwear is not applicable and least 1(2%) always uses footwear, Cotton 39(78%) never uses footwear and least 11(22%) says that footwear is not applicable and Cement 41(82%) says that footwear is not applicable and least 1(2%) rarely uses footwear.

Regarding **washing face, hands and legs after the work,** majority of Dyeing 26 (52%) always washes face, hands and legs after the work and least 4(8%) rarely washes face, hands and legs are not applicable, Cotton 22 (44%) always washes face, hands and legs when off the job and least 1(2%) often washes face, hands and legs when off the job and Cement 49(98%) always washes face, hands and legs when off the job and least 1(2%) often washes face, hands and legs when off the job.

Regarding **exhaust ventilation,** majority of Dyeing 49 (98%) are always using exhaust ventilation at the work place and least 1(2%) says that exhaust ventilation is not applicable, Cotton 45 (90%) are always using exhaust ventilation at the work place and least 5(10%) often uses exhaust ventilation and Cement 50 (100%) are having exhaust ventilation at their work place.

Figure 3 shows frequency and percentage distribution of Dyeing, Cotton and Cement factory workers according to their age.

Regarding **age,** majority of Dyeing 21 (42%) are within 31- 40 years and least are 14(28%) within 41- 50 years, Cotton 36 (72%) are within 41- 50 years and least are 2(4%) within 20 - 30 years and Cement 19 (38%) are within 41- 50 years and least 15(30%) are within 20- 30 years.

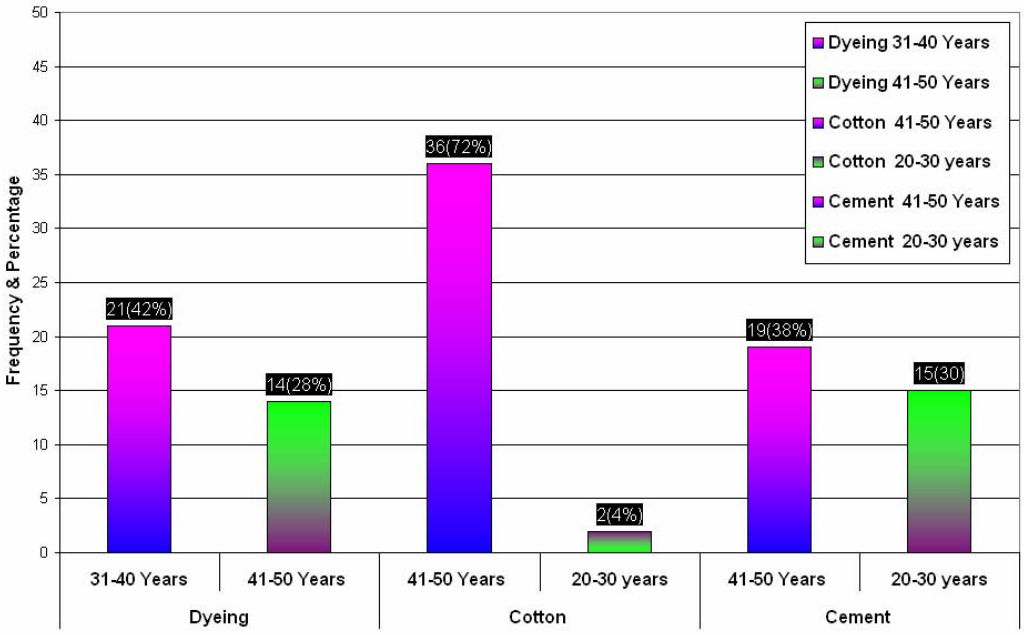

Fig. 3: FREQUENCY AND PERCENTAGE DISTRIBUTION OF DYEING, COTTON AND CEMENT FACTORY WORKERS ACCORDING TO THEIR AGE.

Figure 4 shows frequency and percentage distribution of Dyeing, Cotton and Cement factory workers according to diseases before joining the industry.

Regarding **diseases before joining the industry,** majority of Dyeing 25 (50%) are not having any of the diseases and least 1(2%) have pulmonary diseases, Cotton 30(60%) are having cough with cold and none of them have pulmonary tuberculosis, Cement 35(70%) are not having any of the above diseases and least 1(2%) have pulmonary diseases.

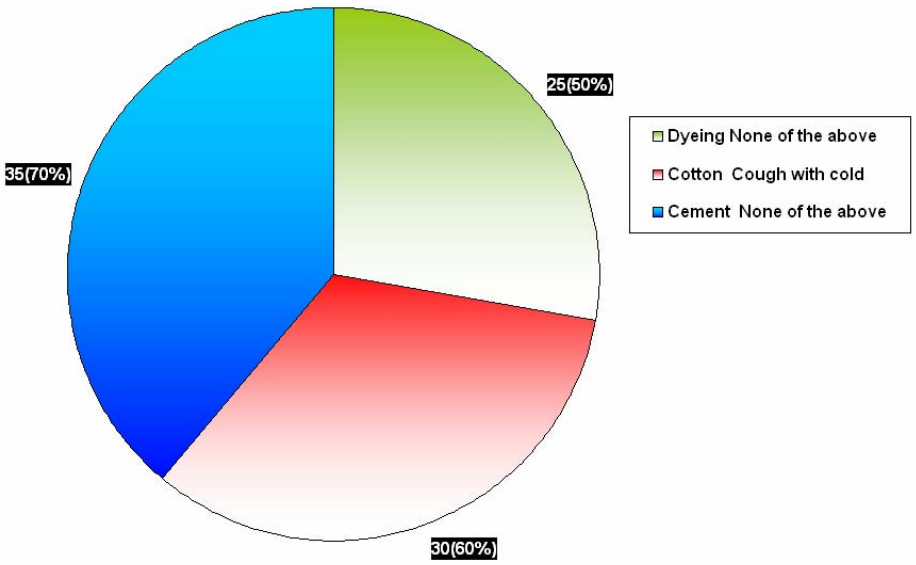

Fig. 4: FREQUENCY AND PERCENTAGE DISTRIBUTION OF DYEING, COTTON AND CEMENT FACTORY WORKERS ACCORDING TO DISEASES BEFORE JOINING THE INDUSTRY

Figure 5 shows frequency and percentage distribution of Dyeing, Cotton and Cement factory workers according to their habits.

Regarding **habits,** majority of Dyeing 25 (50%) are having the habit of drinking and least 1(2%) are having the habit of smoking, Cotton 27(54%) are having the habit of both smoking and drinking and least 5(10%) are having the habit of smoking and Cement 15(30%) are having the habit of drinking and least 10(20%) are not having any of the habits.

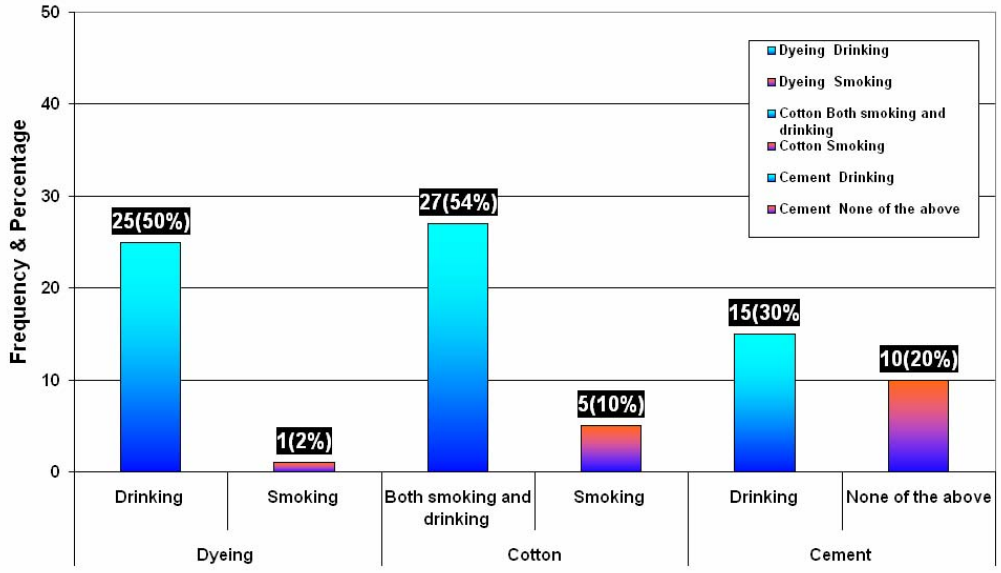

Fig. 5: FREQUENCY AND PERCENTAGE DISTRIBUTION OF DYEING, COTTON AND CEMENT FACTORY WORKERS ACCORDING TO THEIR HABITS

SECTION - II: DATA REGARDING RESPIRATORY HEALTH OF DYEING, COTTON AND CEMENT FACTORY WORKERS.

For the purpose of the study the following null hypothesis was stated

H_{01} : There will be no significant difference in the respiratory health of Dyeing, Cotton and Cement factory workers.

TABLE – 2

Comparison of mean and standard deviation of Dyeing, Cotton and cement factory workers and their respiratory health

Area	n	Mean Respiratory health (max 45)	Range	Standard deviation	95% confidence interval		F	p
					Lower bound	Upper bound		
Dyeing	50	10.22	26	7.11	8.20	12.24		
Cotton	50	9.64	37	6.99	7.65	11.63	31.68	<.001
Cement	50	19.00	26	5.53	17.43	20.57		

Table 2 reveals the comparison of mean and standard deviation of Dyeing, Cotton and cement factory workers regarding their respiratory health.

Workers in the Cement factory reported the higher respiratory problem, Mean = 19 (SD = 5.5) and workers in the cotton factory reported the least respiratory problem, Mean = 9.6 (SD = 6.99). The obtained F- ratio, F= 31.68 (P < .001) suggested significant difference in respiratory problems among the workers in Dyeing, Cotton and Cement factories.

SECTION - III: DATA ON ASSOCIATION BETWEEN THE SELECTED BACKGROUND FACTORS AND THE RESPIRATORY HEALTH OF THE DYEING, COTTON AND CEMENT FACTORY WORKERS

For the purpose of the study the following null hypothesis H_0 was stated.

H_{02} : There will be no significant association between the selected background factors and the respiratory health of the Dyeing, Cotton and Cement factory workers.

Table – 3

Find out the association between the selected background factors and the respiratory health of the Dyeing, Cotton and Cement factory workers

Selected factors	Dyeing (n=50)			Cotton (n=50)			Cement (n=50)		
	β (95%CI= Lower-upper)	t	p	β (95%CI= Lower-upper)	t	P	β (95%CI= Lower-upper)	t	p
1. Age	0.03 (-1.4 – 2.1)	0.38	.69	0.4 (-4.2 – 5.6)	.055	.77	.29 (.41 – 3.5)	2.58	**.02(S)**
2. Body mass index	-.09 (-3.1 - .65)	-1.29	1.9	-1.3 (-5.2 – 3.6)	-.08	.71	-.22 (-11 – 1.7)	-1.53	.14
3. Literacy status	.09 (-.72 – 3.9)	1.36	1.8	1.4 (-3.5 – 7.2)	.13	.49	-.09 (-3.2 – 1.3)	-.86	.39
4. Working hours	.08 (-2.5 – 5.5)	0.73	.46	.7 (-7.7 –12.3)	.06	.64	.06 (-7.7 – 12.3)	.47	.64
5. Marital status	.06 (-2.2 – 4.9)	0.75	.45	0.8 (-12.6-17.6)	.07	.74	.11 (-1.4 – 4.5)	1.08	.29

Selected factors	Dyeing (n=50)			Cotton (n=50)			Cement (n=50)		
	β (95%CI= Lower-upper)	t	p	β (95%CI= Lower-upper)	t	P	β (95%CI= Lower-upper)	t	p
6. Residential status	-.06 (-2.3 – 2.1)	-.08	.93	-.08 (-6.6 – 4.8)	-.06	.75	.04 (-2.4 – 1.4)	-.52	.61
7. Medical check up	-.08 (-2.1 - .58)	-1.12	.26	-1.1 (-5.2 – 2.3)	-.16	.44	.15 (-.24 – 1.9)	1.59	.12
8. Diseases	.08 (-.31 – 1.2)	1.17	.24	1.2 (-2.4 – 1.8)	-.07	.76	**.26 (-.31 – 2.1)**	**2.75**	**01(S)**
9. Habits	.06 (-.63 – 1.6)	0.86	.38	0.9 (-1.7 – 4.3)	.16	.39	**-.36 (-3.2 - -.46**	**-2.71**	**.01(S)**
10. CC on expiration	.03 (-.7 – 0.7)	0.10	.91	0.10 (-.39 – 1.9)	.60	.19	.60 (-.39 – 1.9)	1.34	.19
11. CC on inspiration	-.29 (-1.1 - .39)	-.98	.32	-.98 (-.76 - .28)	-.24	.35	-.65 (-2.1 - .26)	-1.58	.12
12. Face mask	-.29 (-3.6 - -.9)	-3.35	**.01(S)**	-3.4 (-4.9 - .87)	-.25	.17	-.13 (-2.9 – 1.9)	-.88	.38
13. Gloves	.23 (-.27 – 2.6)	2.44	**.02(S)**	2.4 (-.79 – 3.5)	.25	.21	-.47 (-4.7 - -.22)	-2.05	0.5
14. Earplugs	.07 (-1.2 – 3.1)	.89	.37	.89 (-8.0 – 5.4)	-.09	.69	-.25 (-2.6 – 4.7)	1.82	.08
15. Footwear	**-.18 (-3.6 - -.2)**	**-2.22**	**.03(S)**	-2.2 (-5.9 – 10.1)	.13	.59	-.14 (-2.8 – 1.3)	-.77	.45
16. Wash face, hands and legs	.14 (-.14 – 1.5)	1.62	.10	1.6 (-1.7 – 1.3)	-.04	.84	.05 (-6.3 – 10.4)	.49	.63

Selected factors	Dyeing (n=50)			Cotton (n=50)			Cement (n=50)		
	β (95%CI= Lower-upper)	t	p	β (95%CI= Lower-upper)	t	P	β (95%CI= Lower-upper)	t	p
17. Exhaust ventilation	.12 (-.02 – 5.5)	1.98	.05	1.9 (-5.9 – 12)	.14	.48	**.62 (-.31 - -.02)**	**.21**	**.04(S)**

CC = Chest circumference s = Significant

Table 4 reveals that linear regression on respiratory health among Dyeing, Cotton and Cement factory workers and their selected factors.

There was significant association between face mask, t= -3.35(p<.05); gloves, t= 2.44(p=<.05); foot wear, t= - 2.22 (p<.05); and respiratory health among Dyeing workers.

There is no significant association between selected background factors and respiratory health among cotton mill workers (p> .05)

There was significant association between age, t= 2.58 (p<.05); diseases after joining the industry, t= 2.75 (p<.05); habits, t= -2.71 (p<.05); gloves, t= -2.05 (p<.05); exhaust ventilation, t= .20 (p<.05); and respiratory health among Cement factory workers.

CHAPTER – V

SUMMARY, FINDINGS, DISCUSSION, IMPLICATIONS, LIMITATIONS, RECOMMENDATIONS AND CONCLUSIONS

The essence of any research project lies in reporting the findings. The chapter includes the summary, findings, discussions, implications, limitations, recommendations and conclusions for further studies.

SUMMARY

The study was intended to compare the Respiratory health among Dyeing, Cotton and Cement factory workers.

The objectives of the study were,

1. To compare the respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.
2. To find out the association between the selected background factors and the respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.

The study attempted to examine the following research hypothesis;

H1 : There will be a significant difference in the respiratory health among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, T.N.

H2 : There will be a significant association between the respiratory health and selected background factors among Dyeing, Cotton and Cement factory workers in selected areas of Namakkal, TN.

Review of related literature enabled the investigator to develop the conceptual framework, tool and methodology. The review of literature was organized as, Studies related to Dyeing, Studies related to Cotton and Studies related to cement factory workers.

The conceptual framework was developed based on Epidemiological triad. It consisted of interactions between the agent, host and environmental factors leading to respiratory problems.

The research design adopted for the study was descriptive in nature and to be precise a comparative design. Setting chosen to conduct the study were selected villages, Namakkal. The target populations in the study were Dyeing, Cotton and Cement factory workers between the age group of 20- 50 years.

In this study the sample size was 50 Dyeing workers, 50 Cotton workers and 50 Cement factory workers. The sampling technique was convenient method. The tool used to collect data was an interview / observation schedule on Respiratory health.

The reliability of the tool was established by inter- rater method. The computed reliability co-efficient was r=0.96 high. Pilot study was conducted at Elanthakuttai among 15 Quarry workers who were similar to study population.

The main study was conducted in Namakkal district, among Dyeing workers at Komarapalayam, Cotton mill workers at Vattamalai and Cement factory workers in Thattankuttai. All the Dyeing, Cotton and Cement factory workers, fulfilling sampling criteria

were included in the study. The objective of the study was explained to the samples and informed consent was obtained. Respiratory health problems were measured using interview schedule. The data gathered were analyzed using SPSS version 10 and interpretation was made based on the objectives of the study. A probability of < 0.05 was considered to be significant.

CHARACTERISTICS OF THE STUDY SAMPLE

Majority of Dyeing workers 21 (42%) were between the age group of 31- 40 years, were having normal BMI 35 (70%), were literates 34 (68%), were working for more than 8 hours, were married 44 (88%), were staying within 5km from the mill 36 (72%), were not having regular medical check-up 42 (84%), were not having any diseases before joining the industry 25 (50%), were having the habits of drinking 25 (50%), were having the difference of 2cm chest circumference 18(36%), were rarely using face mask 18 (36%), were saying that gloves 48(96%), earplugs 46 (92%), footwear 49 (98%) were not applicable at the work place, were washing face, hands and legs after the work 26 (52%) and were always using exhaust ventilation at the work place 49 (98%).

Majority of Cotton mill workers 36 (72%) were between the age group of 41- 50 years, were having normal BMI 29 (58%), were literates 28 (56%), were working for more than 8 hours 50 (100%), were married 48 (96%), were staying within 5km from the mill 33 (66%), were not having regular medical check-up 31 (62%), were having cough with cold before joining the industry 30 (60%), were having the habits of both smoking and drinking 27 (54%), were having the difference of 1cm chest circumference 20 (40%), were never using face mask 20(40%), gloves 27(54%), footwear 39 (78%), says that earplugs were not applicable at the work place 35 (70%), were always washing face, hands and legs after the work 22 (44%) and were always using exhaust ventilation at the work place 49 (98%).

Majority of Cement factory workers 19 (38%) were between the age group of 41- 50 years, were having normal BMI 47 (94%), were literates 31 (62%), were working for 8 hours 49 (98%), were married 41 (82%), were staying within 5km from the mill 30 (60%), were not having regular medical check-up 22 (44%) and 22 (44%) go for medical check-up once in a year, were not having any diseases before joining the industry 35 (70%), were having the habits of drinking 15 (30%), were having the difference of 1cm chest circumference 35(70%), were never using face mask 35(70%), were rarely using gloves 33 (66%), were never using earplugs 39 (78%), says that footwear is not applicable at the work place 41 (82%), were always washing face, hands and legs after the work 49 (98%) and were always using exhaust ventilation at the work place 50 (100%).

FINDINGS

The findings of the study are arranged based on objectives of the study.

Objective 1: To compare the Respiratory health of the Dyeing, Cotton and Cement factory workers.

- Workers in the Cement factory reported the higher respiratory problem, Mean = 19 (SD = 5.5) and workers in the cotton factory reported the least respiratory problem, Mean = 9.6 (SD = 6.99).
- There was a significant difference between respiratory health among Dyeing, Cotton and Cement factory workers, F- ratio is 31.68 (p=0.001).

Objective 2: To find the association between Respiratory health and selected background factors among Dyeing, Cotton and Cement factory workers.

- There was significant association between face mask, t= -3.35(p<.05); gloves, t= 2.44(p=<.05); foot wear, t= - 2.22 (p<.05); and respiratory health among Dyeing workers.

- None of the selected background factors were associated with respiratory health among cotton mill workers (p>.05)
- There was significant association between age, t= 2.58 (p<.05); diseases after joining the industry, t= 2.75 (p<.05); habits, t= -2.71 (p<.05); gloves, t= -2.05 (p<.05); exhaust ventilation, t= .20 (p<.05); and respiratory health among Cement factory workers.

DISCUSSION

The discussions of results were based on findings of the study.

Findings 1: Findings on respiratory health among Dyeing, Cotton and Cement factory workers.

- Workers in the Cement factory reported the higher respiratory problem, Mean = 19 (SD = 5.5) and workers in the cotton factory reported the least respiratory problem, Mean = 9.6 (SD = 6.99.
- There was significant difference between respiratory health among Dyeing, Cotton and Cement factory workers, F= 31.68 (p=0.001).

The finding was not supported by the study done by **Oleru U G (1980)** reported that the greatest risk to pulmonary function for the exposed subjects resulted from exposure to cotton dust than Dyeing and Cement factory workers.

Findings 2: Findings related to the significant association between respiratory health and selected background factors.

- There was significant association between face mask, t= -3.35(p<.05); gloves, t= 2.44(p=<.05); foot wear, t= - 2.22 (p<.05); and respiratory health among Dyeing workers.

- None of the selected background factors were associated with respiratory health among cotton mill workers (p> .05)
- There was significant association between age, t= 2.58 (p<.05); diseases after joining the industry, t= 2.75 (p<.05); habits, t= -2.71 (p<.05); gloves, t= -2.05 (p<.05); exhaust ventilation, t= .20 (p<.05); and respiratory health among Cement factory workers.

The findings were not supported by the study done by **Yi Al-Neaimi (2001)** reported that respiratory health effects observed among cement workers could not be explained by age, BMI and smoking, and were probably caused by exposure to cement dust.

The findings were supported by the study done by **Grewalks (1997),** reported that an exposure for 20 years is required to develop the disease if the workers are detected in the early stages of disease, the process is reversible by removing him from exposure.

IMPLICATION

The findings of the study have implication in nursing practice, nursing education and research.

Occupational Nursing practice

- ❖ Respiratory health need to be assessed on all workers.
- ❖ Workers in cement factory need more facility to promote respiratory health.
- ❖ People with higher age must be relieved from the cement factory.
- ❖ Habits of cement factory workers which impair respiratory health need to be identified and treated.
- ❖ Exhaust ventilation need to be provided adequately.

Nursing Research

- The study will be a valuable reference material for future researchers.
- Dyeing, Cotton and Cement factory workers had significant increase in Respiratory health problems and are in need of more research.
- Studies with objective measurement of respiratory health can be performed.
- Need to assess the influence of regular breathing exercise on respiratory health among factory workers.

LIMITATIONS

- More samples are required in a survey research.
- Only non random sampling method was used.
- Objective measures of respiratory health parameters could have been used.
- Resources as a student investigator were limited.

RECOMMENDATIONS

- Periodical medical examination should be performed to all the Dyeing, Cotton and Cement factory workers.
- Cement factories should provide adequate facilities to promote respiratory health.
- Habits such as smoking and alcohol intake need to be ceased.
- Adequate exhaust ventilation must be provided to prevent respiratory problems.
- Breathing exercises should be practiced to improve the respiratory health of the workers.

CONCLUSION

Respiratory tract diseases were the most important group of occupational diseases in Dyeing, Cotton and Cement factories as a result of inhalation of chemical Dyeing powders, Cotton dust and Cement dust in the work place. There was shortage of health services to workers and nursing services in the factory were not present. Adequate facilities should be provided and habits such as smoking and alcohol intake must be ceased to promote respiratory health among the workers.

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APPENDIX – I

LETTER SEEKING PERMISSION FOR CONTENT VALIDITY

From,

30093631
II year M.Sc (Nursing),
Annai J K K Sampoorani Ammal College of Nursing
Komarapalayam,
Namakkal district.

To,

Through
The Dean,
Annai J K K Sampoorani ammal College of Nursing,
Komarapalayam,
Namakkal District.

Respected Madam/sir

Sub: Letter requesting consent to validate the tool.

I am 30093631, II year M.Sc., Nursing student of Annai JKK Sampoorani Ammal College of Nursing Komarapalayam, under the Tamil Nadu Dr. M G R Medical University, Chennai.

As a partial fulfillment of M.Sc Nursing Programme, I am conducting **"A comparative study to assess the respiratory health among Dyeing, Cotton and Cement factory workers in the selected areas of Namakkal, Tamilnadu."**Herewith I am sending the tool for content validity for your expert opinion. I humbly request yourself to spare a little of your valuable time for me which I remain ever grateful to you.

Thanking you

Place: Komarapalayam, Yours sincerely

Date: (30093631)

APPENDIX – II

LIST OF EXPERTS

1. **Dr.J.RAM, MD**
   Pulmonologist,
   Gokulam Medical hospital,
   Salem

2. **Dr.K. SELVAKUMARI, MD**
   Physician
   Gokulam Medical hospital,
   Salem

3. **Dr. TAMILMANI Ph.D.,(N)**
   Principal,
   Department of Community Health Nursing,
   Annai JKK Sampoorani Ammal College of Nursing, Komarapalayam.

4. **Mrs. PANDIMA DEVI M.Sc.,(N)**
   Department of Community Health Nursing,
   Annai JKK Sampoorani Ammal College of Nursing, Komarapalayam.

5. **Mrs.SOBHANA,M.Sc.,(N)**
   Department of Medical Surgical Nursing,
   Annai JKK Sampoorani Ammal College Of Nursing,Komarapalayam.

APPENDIX – III

CONTENT VALIDITY CERTIFICATE

Name :

Designation :

Name of college :

I hereby certify that I have validated the tool of **30093631**, II M.Sc (Nursing), student who is undertaking "**A comparative study to assess the respiratory health among Dyeing, Cotton and Cement factory workers in the selected areas of Namakkal, Tamilnadu.**

Place: Komarapalayam Signature of the expert

Date : Designation

APPENDIX – IV

QUESTIONNAIRE ON RESPIRATORY HEALTH AMONG FACTORY WORKERS

CODE NO.....

PART-I

BACKGROUND FACTORS

Instruction

Read the following questions listed below and put a tick (√) mark against the appropriate response. The information you shared will be treated confidentially.

1) State your age.
   a. 21-30 years ☐
   b. 31-40 years ☐
   c. 41-50 years ☐

2) Occupational experience in the factory
   Working section with period in years
   1. Quarry.....years ☐
   2. Cement factory.....years ☐
   3. Tannery .....years ☐
   4. Cotton industry.....years ☐

3) Your weight .....kgs and Your Height .....cms

4) Body Mass Index
   a. Normal ☐
   b. obese ☐
   c. under nourished ☐

5) Literacy status
   a. can read or write ☐
   b. cannot read or write ☐

6) State your working hours
   a. < 8 hours ☐
   b .8 hours ☐
   c. >8 hours ☐

7) State the marital status
   a. single ☐
   b. married ☐
   c. divorced ☐

8) Residential status

a. 5km away from factory ☐

b. within 5km from factory ☐

9) How often do you have medical checkup?

a. Once a year ☐

b. every 6 months ☐

c. Not regular ☐

10) Have you ever suffered from the following disease before joining the industry?

a. frequent attack of cough with cold ☐

b. bronchial asthma ☐

c. pulmonary tuberculosis ☐

11) Do you have any of the following habits?

a. Smoking ☐

b. Drinking ☐

c. none of the above ☐

12) Chest circumference

a. on inhalation.....cm

b. on exhalation.....cm

c. difference.....cm

13) Personal safety measures

S.no	PERSONAL SAFETY MEASURES	ALWAYS	OFTEN	RARELY	NEVER	NOT APPLI CABLE
1	I use face mask					
2	I use gloves					
3	I use ear plugs					
4	I use boots / footwear					
5	I wash hands, face and legs thoroughly when off the job					
6	Exhaust ventilation is available at my work					

PART-II

SCHEDULE ON RESPIRATORY HEALTH AMONG FACTORY WORKERS

CODE NO.....

Instruction:

State how often you had suffered from the following in the past one year

S.NO	Symptoms	>5 times in a year	3-5times in a year	<3 times in a year
1	Cough			
2	Cough with sputum			
3	Hemoptysis (bloody sputum)			
4	cough with fever lasting for more than two weeks			
5	Breathing difficulty(obstructive breathing)			
6	Breathlessness while at work			
7	Grunting (noisy breathing)			
8	Tightness of the chest			
9	Nasal discharge (running nose)			
10	Wheezing (whistling sound)			
11	Weight loss			
12	Pleuritic chest pain			
12	Shortness of breath (Dyspnoea)			
13	Fatigue			

14. Did you ever got admitted and treated for respiratory problems

No ☐

Yes ☐

15. Have you ever been taken medication without consultation of doctor?

> 5 times in a year ☐

3-5 times in a year ☐

< 3 times in a year ☐

APPENDIX – V

தொழிற்சாலையில் வேலை செய்பவர்களின்
நுரையீரல் ஆரோக்கியம் (நலம்) பற்றிய வினாத்தொடர்

தொகுப்பு எண் .....

பகுதி – 1

பின்புறக் காரணிகள்

குறிப்பு

கீழே குறிப்பிடப்பட்டுள்ள (கீழ்க்கண்ட) வினாக்களைப் படித்து அதற்கேற்ற சரியான பதிலை கட்டத்தில் (✓) குறியிடவும்.

1) உங்களுடைய வயதைக் குறிப்பிடவும்.

அ. 21-30 வயதிற்குள் ☐

ஆ. 31-40 வயதிற்குள் ☐

இ. 41-50 வயதிற்குள் ☐

2) வேலையில் எத்தனை ஆண்டு உங்களுக்கு அனுபவம்.

அ. சாயமிடும் தொழில் ..... ஆண்டுகள் ☐

ஆ. சிமெண்ட் மற்றும் சுரங்க தொழிற்சாலை ..... ஆண்டுகள் ☐

இ. தோல் பதனிடும் தொழிற்சாலை ..... ஆண்டுகள். ☐

ஈ. பஞ்சு தொழிற்சாலை ..... ஆண்டுகள் ☐

3) உங்களுடைய எடை ..... கிலோ,

உங்களுடைய உயரம் ..... செ. மீ.

4) உடல் பருமன் (Calculate)

அ. சரியான எடை அளவு ☐

ஆ. உடல் பருமன் ☐

இ. எடை குறைவு ☐

5) கல்வித்தகுதி

அ. எழுதவோ அல்லது படிக்கவோ தெரியும். ☐

ஆ. எழுதவோ அல்லது படிக்கவோ தெரியாது. ☐

6) உங்களுடைய பணி நேரம் என்ன ?

அ. 8 மணி நேரத்திற்கும் குறைவு ☐

ஆ. 8 மணிநேரம் ☐

இ. 8 மணிநேரத்திற்கும் அதிகம். ☐

7) உங்கள் திருமண வாழ்க்கை நிலை என்ன ?

அ. திருமணமாகாதவர் ☐

ஆ. திருமணமானவர் ☐

இ. விவாகரத்தானவர் ☐

ஈ. மனைவி இழந்தவர் ☐

8) உறைவிடம் பற்றிய நிலை

அ. தொழிற்சாலையில் இருந்து 5 கிலோ மீட்டர் தொலைவிற்கு அப்பால் உள்ளது. ☐

ஆ. தொழிற்சாலையில் இருந்து 5 கிலோ மீட்டர் தொலைவிற்குள் உள்ளது. ☐

9) எவ்வளவு நாட்களுக்கு ஒருமுறை மருத்துவப் பரிசோதனைக்கு செல்வீர்கள்

அ. வருடத்திற்கு ஒருமுறை ☐

ஆ. 6 மாதத்திற்கு ஒருமுறை ☐

இ. சீரான மருத்துவ பரிசோதனை கிடையாது. ☐

10) நீங்கள் தொழிற்சாலையில் சேர்வதற்கு முன்பு, கீழ்குறிப்பிட்டுள்ள வியாதிகளினால் கஷ்டப்பட்டது உண்டா ?

அ. அடிக்கடி இருமல் மற்றும் சளித்தொந்தரவு ☐

ஆ. ஆஸ்துமா ☐

இ. நுரையீரல் காச நோய். ☐

11) உங்களுக்கு கீழே குறிப்பிட்டுள்ள பழக்கங்களில் ஏதேனும் உள்ளதா ?

அ. புகைபிடித்தல் ☐

ஆ. மது அருந்துதல் ☐

இ. மேலே குறிப்பிட்டுள்ள எதுவும் கிடையாது. ☐

12) மார்பகச் சுற்றளவு

அ. மூச்சை உள்ளிழுக்கும் போது ..... செ. மீ.

ஆ. மூச்சை வெளிவிடும் போது. ..... செ. மீ.

இ. மூச்சை உள்ளிழுக்கும் போதும், வெளிவிடும் போதும் எடுக்கப்பட்ட மார்பகச் சுற்றளவுகளுக்கு இடையே உள்ள வித்தியாசம் (வேறுபாடு) ..... செ. மீ

13) தற்காப்பு நடவடிகக்கைகள்

பிரிவு எண்	தற்காப்பு நடவடிக்கைகள்	எப்பொழுதும்	அடிக்கடி	அரிதாக	ஒரு பொழுதும் இல்லை	பொருந்தாது
1	நான் முக உறை பயன் படுத்துவேன்					
2	நான் கை உறை பயன்படுத்துவேன்					
3	நான் காது அடைப்பான் பயன்படுத்துவேன்					
4	நான் மிதியடி பயன்படுத்துவேன்					
5	நான் வேலையில் இருந்து வந்தவுடன் கை, கால் மற்றும் முகத்தை நன்கு கழுவுவேன்					
6	நான் வேலை செய்யும் இடத்தில் உள் காற்றை வெளிக்கொண்டு செல்லும் காற்றோட்ட வசதி உள்ளது.					

பகுதி - 2

தொழிற்சாலையில் வேலை செய்பவர்களின் நுறையீரல் ஆரோக்கியம் பற்றிய அட்டவணை

தொகுப்பு எண் .....

குறிப்பு

கடந்த ஒரு ஆண்டில் நீங்கள் எவ்வளவு நாட்களாக கீழ்காணும் தொந்தரவுகளால் கஷ்டப் பட்டீர்கள் என்பதை குறிப்பிடுக.

தொடர் எண்	அறிகுறிகள்	ஒருவருடத்தில் 5 முறைக்கு மேல்	ஒருவருடத்தில் 3 - 5 முறை	மூன்று முறைக்கு கீழ்	இல்லவே இல்லை
1	இருமல்				
2	இருமலுடன் சளி வருதல்				
3	சளியுடன் ரத்தம் கலந்து இருத்தல்				
4	இருமல் மற்றும் காய்ச்சல் தொந்தரவு 2 வாரத்திற்கு மேல் நீடித்தல்				
5	மூச்சடைப்பு				
6	வேலை செய்யும் பொழுது மூச்சு வாங்குதல்				
7	உறுமும் சத்தத்துடன் மூச்சு வாங்குதல்				
8	மார்பக இருக்கம்				
9	மூக்கில் இருந்து நீர் வடிதல்				
10	மூச்சுத்திணறல்				
11	மூச்சு விடும் பொழுது நெஞ்சு வலித்தல்				
12	மூச்சு விட சிறமப்படுதல்				
13	களைப்பு				

14. சளி மற்றும் நுரையீரல் சம்பந்தமான வியாதியினால், உள்நோயாளியாக கடந்த ஒரு ஆண்டில் சிகிச்சை பெற்றதுண்டா ?

அ. ஆம் ☐

ஆ. இல்லை. ☐

15. சளி மற்றும் நுறையீரல் சம்பந்தமான வியாதியினால், மருந்து கடையில் (டாக்டரை அணுகாமல்) நேரடியாக மருந்து வாங்கியதுண்டா ?

அ. வருடத்திற்கு 5 முறைக்கு மேல் ☐

ஆ. ஒருவருடத்தில் 3-5 முறைகள் மட்டும் ☐

இ. வருடத்தில் 3 முறைக்கு கீழ் ☐

ABSTRACT

A comparative study to assess respiratory health among dyeing, cotton and cement factory workers in selected areas of Namakkal, TN was conducted by 30093631 is submitted as the partial fulfillment of the requirement for the Degree of Master Science in Nursing from Annai J.K.K Sampoorani Ammal College of Nursing ,Komarapalayam under the Tamil Nadu Dr.M.G.R.Medical University,Chennai, April 2010-2011.

The objectives of the study were (1) To compare the respiratory health among dyeing, cotton and cement factory workers. (2)To find out the association between the respiratory health and the selected background factors among dyeing, cotton and cement factory workers.

The hypothesis of the study were (1)There will be a significant difference in the respiratory health among dyeing, cotton and cement factory workers. (2)There will be a significant association between the respiratory health and the selected background factors among dyeing, cotton and cement factory workers.

The investigator organized the review of literature under 3 sections as follows (1) studies related to the respiratory health among Dyeing workers. (2)Studies related to the respiratory health among Cotton mill workers. (3) Studies related to the respiratory health among Cement factory workers.

The conceptual framework for the study was designed by the investigator on the basis of Epidemiological Traid. The research design used was descriptive design, comparative in nature. The setting of the study was Komarapalayam and Thattankuttai in Namakkal district Tamilnadu. The sample size of the study was 150 male workers fifty in each Dyeing, Cotton and Cement factory selected by Quota sampling method.

The data were collected by semi structured questionnaire, developed by the investigator. The tool was validated by 5 experts. The data collected were tabulated, analyzed, and interpreted by SPSS package(version 10.0).

The findings of the study revealed that (1) There was a significant difference in the respiratory health among dyeing, cotton and cement factory workers. (2) There was a significant association between the respiratory health and the selected background factors among dyeing, cotton and cement factory workers.

The study clearly concluded by stating the implications, limitations, and recommendations.